EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

A. J. HAIN
Managing Editor

E. F. ROSS
Engineering Editor

D. S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE — J. D. KNOX
W. G. GUDE — G. W. BIRDSALL
W. J. CAMPBELL

New York
I. H. SUCH — B. K. PRICE
L. E. BROWNE

Pittsburgh — R. L. HARTFORD
Chicago — J. F. POWELL
Detroit — A. H. ALLEN
Washington — L. M. LAMM

London
VINCENT DELPORT

BUSINESS STAFF

G. O. HAYS
Business Manager

C. H. BAILEY
Advertising Service

New York . . E. W. KREUTZBERG, B. C. SNELL
Pittsburgh . . . S. H. JASPER
Chicago . . . L. C. PELOTT, W. F. O'DELL
Cleveland . . . R. C. JAENKE

J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland

BRANCH OFFICES

New York . . . 220 Broadway
Chicago . . Peoples Gas Building
Pittsburgh . 1800 Koppers Building
Detroit . 1010 Stephenson Building
Washington . National Press Building
Cincinnati . . . 282 Sinton Hotel
San Francisco . . 2413 Milvia St.
Berkeley, Calif., Tel. Berk. 7354-W
London . . . . Caxton House, Westminster, S.W. 1
Berlin . Berlin, N.W. 40, Roonstrasse 10

• • •

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. JOHN A. PENTON, Chairman of Board; E. L. SHANER, President and Treasurer; J. R. DAWLEY and G. O. HAYS, Vice Presidents; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

Copyright 1938 by the Penton Publishing Co.

STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

Contents

Volume 103—No. 19 **November 7, 1938**

READER COMMENTS 11
AS THE EDITOR VIEWS THE NEWS 15
NEWS
- Stainless Steel on Missions of Mercy in Hospital Field 17
- Steel Loses $1.69 Per Ton on Finished Material 19
- Payrolls for 21 Months Equal Third of Industry's Capitalization 20
- Steelworks Operations for Week 20
- Japan Closing Door to Finished Products, Takes More Scrap 21
- Activities of Steel Users and Makers 22
- Firm National Policy on American Foreign Trade Urged by Council 23
- "Bethlehem and the Public"; Frank Explanation to Employes 27
- Meetings 27
- Men of Industry 32
- Obituaries 33
- Finished Steel Output Up 17.6 Per Cent 34
- Resumption of 17 Furnaces Pushes October Pig Iron Up 35
- Stainless Steel at Bottlers' Show 96

WINDOWS OF WASHINGTON 25
MIRRORS OF MOTORDOM 29
EDITORIAL—Between the Millstones 36
THE BUSINESS TREND
- Activity Index Nears Comparative 1937 Level 37
- Charts and Statistics 37-39

TECHNICAL
- Wire Coiling Machines 40
- Triple Machine Weighs 115 Tons 46
- Mechanical Engineers Scheduling Many Sessions for Annual Meeting 61
- Purdue Foundry Meeting Surveys Recent Progress 64

MATERIALS HANDLING
- Assembly Serving 42

PROGRESS IN STEELMAKING
- Adds Three-High Mill 44

JOINING AND WELDING
- Boiler Fabrication 48

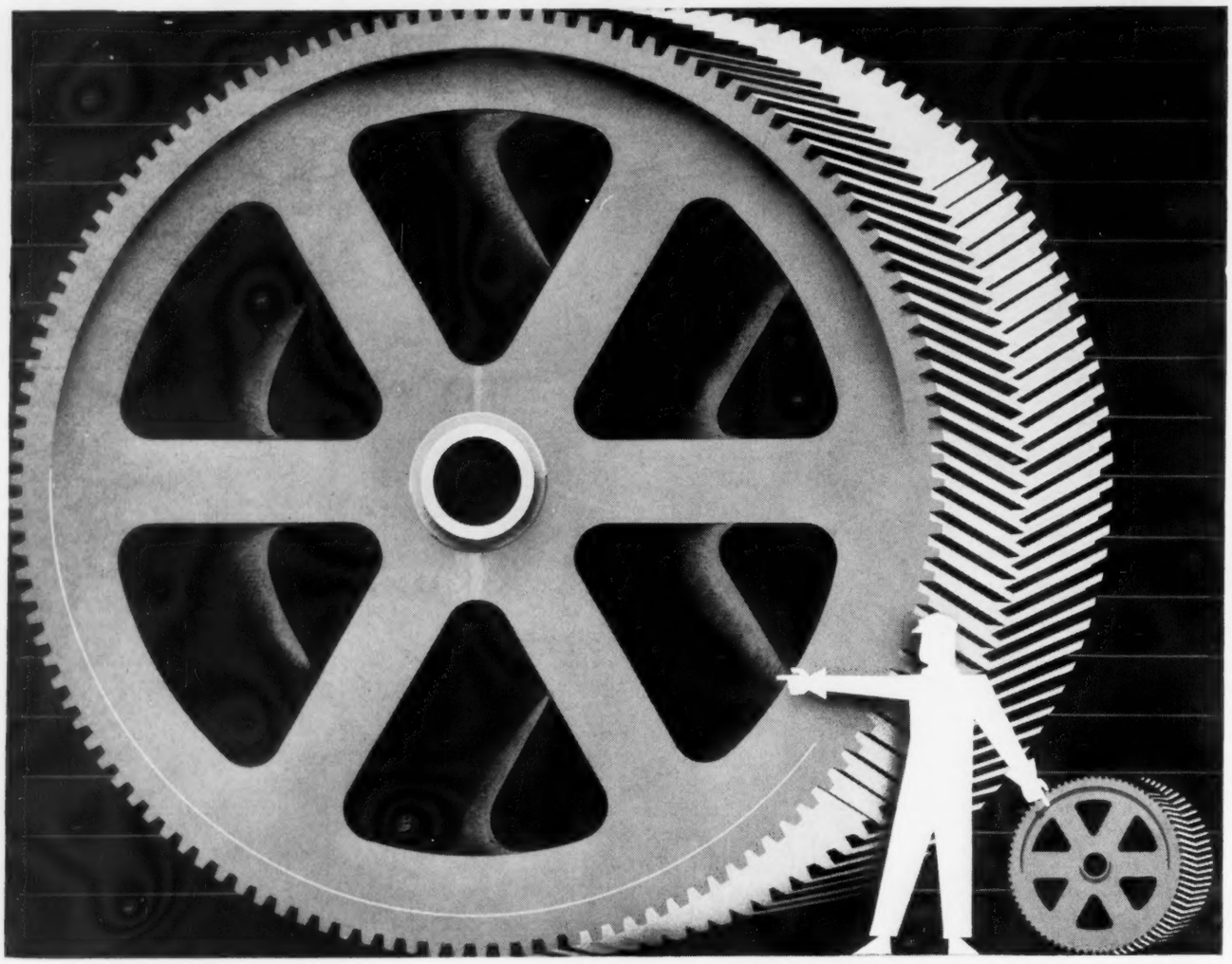
HEAT TREATING
- Hardenability 52

STAMPING
- Combination Stamping 62

INDUSTRIAL EQUIPMENT 66
HELPFUL LITERATURE 69
MARKET REPORTS AND PRICES 75
- The Market Week 76

BEHIND THE SCENES 90
CONSTRUCTION AND ENTERPRISE 99
INDEX TO ADVERTISERS 124

PRODUCTION • PROCESSING • DISTRIBUTION • USE



DIFFERENT IN SIZE . . . ALIKE IN STEEL

It's a big jump from a 36-inch gear to one of 16 feet weighing 53,000 pounds. Yet their case histories show that such widely varying sizes can be handled with one steel. In these instances a Manganese-Molybdenum (0.15 to 0.20% Mo) steel was used.

In the large gear simple annealing, normalizing and drawing proved sufficient to produce uniformly good physical properties. The smaller gear permitted oil quenching and drawing to even higher physical properties. And, despite the wide variations in sections, no casting defects or machining difficulties were encountered in either of the two products.

Such is the versatility of Moly cast steels. Our free book, ***"Molybdenum in Steel,"*** tells more about them; and our accumulation of practical field data is available to engineers and production executives toward the solution of any specific iron or steel problem. Climax Molybdenum Co., 500 Fifth Ave., N. Y.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

MOLY

Climax Mo-lyb-den-um Company

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ AMERICA had better look to her foreign trade! The United States has been too patient where its interests have been assailed, one eminent authority (p. 23) declared last week, warning that a conciliatory attitude encourages some nations to exclude Americans from foreign markets. Giving point to this utterance, Japan last week announced a policy of keeping Asia for the Asiatics, signifying the end of the "open door" policy in China. Movement of American steel to the Orient continues to fall off (p. 21) and Japan and Germany are studying the finished steel market in the Philippines, by far the most important Far Eastern outlet for American mills. Japan's purchases here now are limited largely to scrap and other raw materials and industrial equipment.

• • •

Business Indexes Up

The business news continues cheering. Steel production last week (p. 20) advanced 3 points to 57½ per cent of ingot capacity, a rate, incidentally, at which most steel producers (p. 19) can make a profit at present production costs. STEEL'S index of industrial activity (p. 37) now stands at 91.5 per cent, new high for this year. October pig iron production was 18.9 per cent above September output and during the month (p. 35) 17 blast furnaces increased the active list to 114. Automobile builders find they will need more steel for 1939 models than expected and there is a rush to place tonnage before possible price readjustments in steel . . . A railroad rehabilitation program (p. 25) will be legislated by the next congress—if railroad wages are maintained.

• • •

Stainless in Hospitals

Hospital requirements in 1937 absorbed approximately 1000 tons of stainless steel; STEEL estimates (p. 17) that this market has potentials for 17,000 tons of corrosion-resisting materials. Recent expositions of equipment for the dairy, baking and beverage industries reveal great progress in the application of stainless and other alloy steels . . . In the past 21 months the steel industry (p. 20) has paid out in wages an amount equivalent to approximately one-third of its total capitalization; for every dollar of profit made $6.79 went to wages . . . Two companies (p. 26) soon will set up plants for converting low-grade manganese ore into manganese metal 99.7 per cent pure, using a new electrolytic process. The process involves high costs and is aimed at helping the national defense.

• • •

Trucks Solve Problem

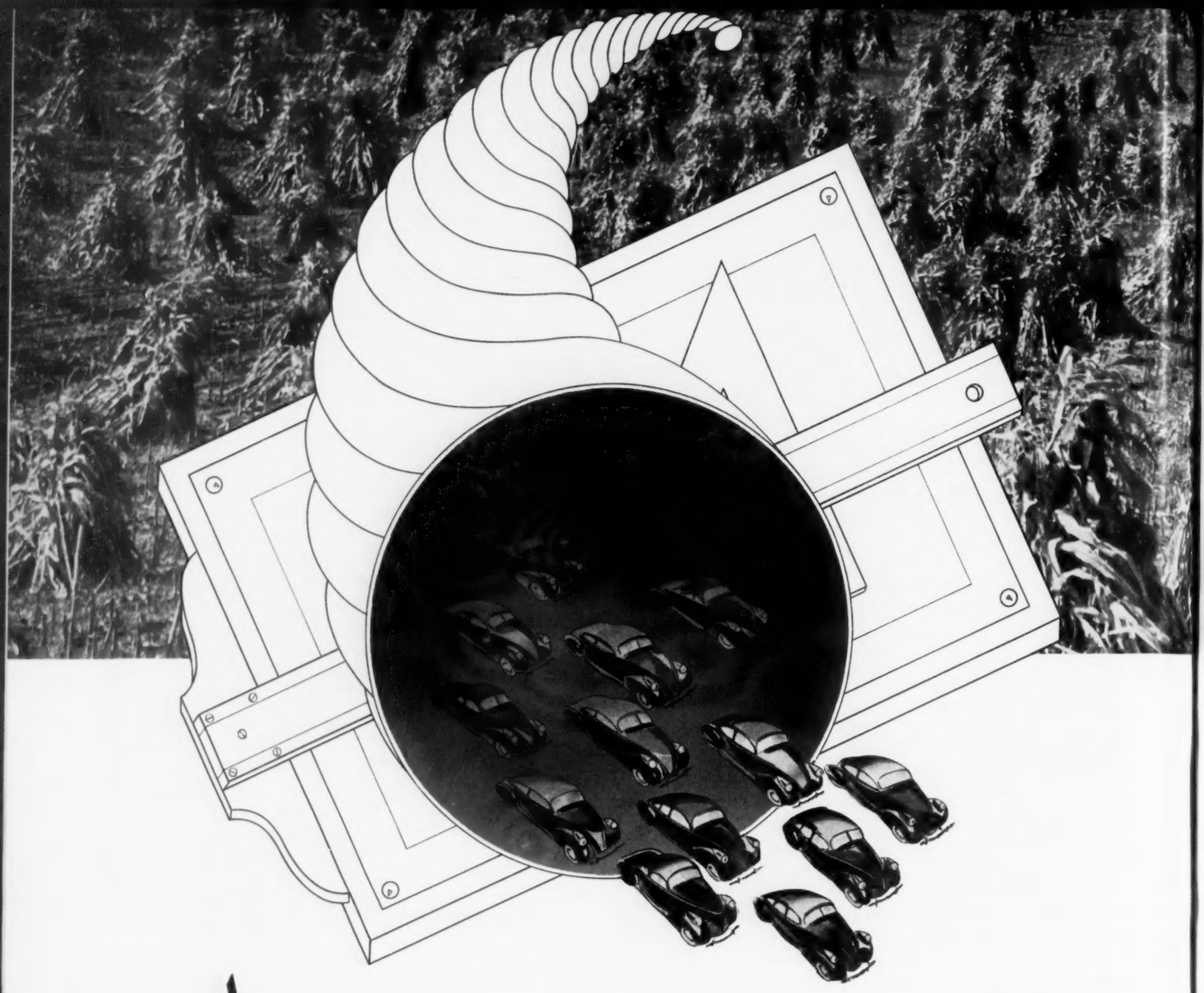
A fleet of battery-operated industrial trucks is credited by a large automobile manufacturer (p. 42) with having almost entirely eliminated those bugbears of mass production—stops at storage. It does this by synchronizing rate of supply of materials and parts with rate of use on the assembly line . . . A new balanced three-high sheet mill (p. 44) incorporates a new development, a friction pinion driving the top roll. Another feature is that the controls are actuated by foot pedals . . . Six flat cars were required to ship a 200,000-pound triple high-power precision horizontal boring, drilling and milling machine (p. 46). It will be used for simultaneous machining of large marine and industrial diesel engines, water turbines, generators and steam condensers.

• • •

Study Steel's Structure

Chemical analysis, "personality" or timbre, grain size and now hardenability, are coming to be accepted terms in identifying heats of steel so that both steelmakers and users will have accurate forehand knowledge of how various steels will behave in fabrication, treatment and service. Much new information has been accumulated on hardenability (p. 52) of medium and low alloy steels . . . A lathe manufacturer employs laminated construction (p. 62) in order to make bed ways resistant to wear . . . Recently developed stamping machinery (p. 62) permits combinations of operations never before possible. The possibilities are interesting . . . Automobile ring gears now are produced twenty per minute on a recently designed machine (p. 40) that is entirely automatic.

E. L. Shaner



America gives thanks, too

FOR THIS HARVEST

It is worth remembering at this season, when America pauses to observe the tradition of Thanksgiving, that more than a third of our national income represents the crop of ideas, planted with fine pen strokes on the drafting board, cultivated in laboratories and harvested in the acres of productive shops. This one-third of our national income represents labor plus ingenuity, value added by manufacture!

No event better typifies this annual harvest from Industry than the fall announcements of new automobiles which serve to summarize the year's technical progress, to quicken the pulse of our entire business life and to bring new convenience and pleasure to American living.

We of Inland—in common with all American industry—find much in which to take pride and for which to be thankful at this season. It has been our privilege to work with many manufacturers of automobiles and of other products. It has been our function, not only to furnish fine steels, but also to provide intimate personal and technical co-operation in the development of better products and lower costs in producing them.

INLAND STEEL COMPANY · CHICAGO

Stainless Steel on Missions of Mercy; Large Tonnage in Hospital Field

■ NEW, interesting and extensive uses of alloy steels—as well as plain carbon varieties—have been demonstrated in the great industrial shows this fall. The national dairy show in Cleveland (STEEL, Oct. 24, p. 35); that of the baking industry in Chicago; and the beverage equipment exposition in New York (p. 96, this issue), have revealed strong trends to corrosion-resisting steels, especially stainless.

Coincident with the national hospital equipment show in Dallas, Tex., STEEL studied this field; learned 1000 tons of stainless was fabricated in 1937; that it presents a large potential market. The 6180 hospitals in the United States represent a $3,000,000,000 investment; normally spend $150,000,000 annually in new construction; $127,500,000 for apparatus and supplies; $108,450,000 for maintenance materials. If all these hospitals were to employ the present developed uses of stainless steel equipment, it is estimated 17,000 tons would be required.

■ AMERICA'S 6180 hospitals constitute an important steel outlet, actually and potentially. In 1937, approximately 1000 tons of stainless steel was used, in addition to substantial tonnages of other steels and other metals.

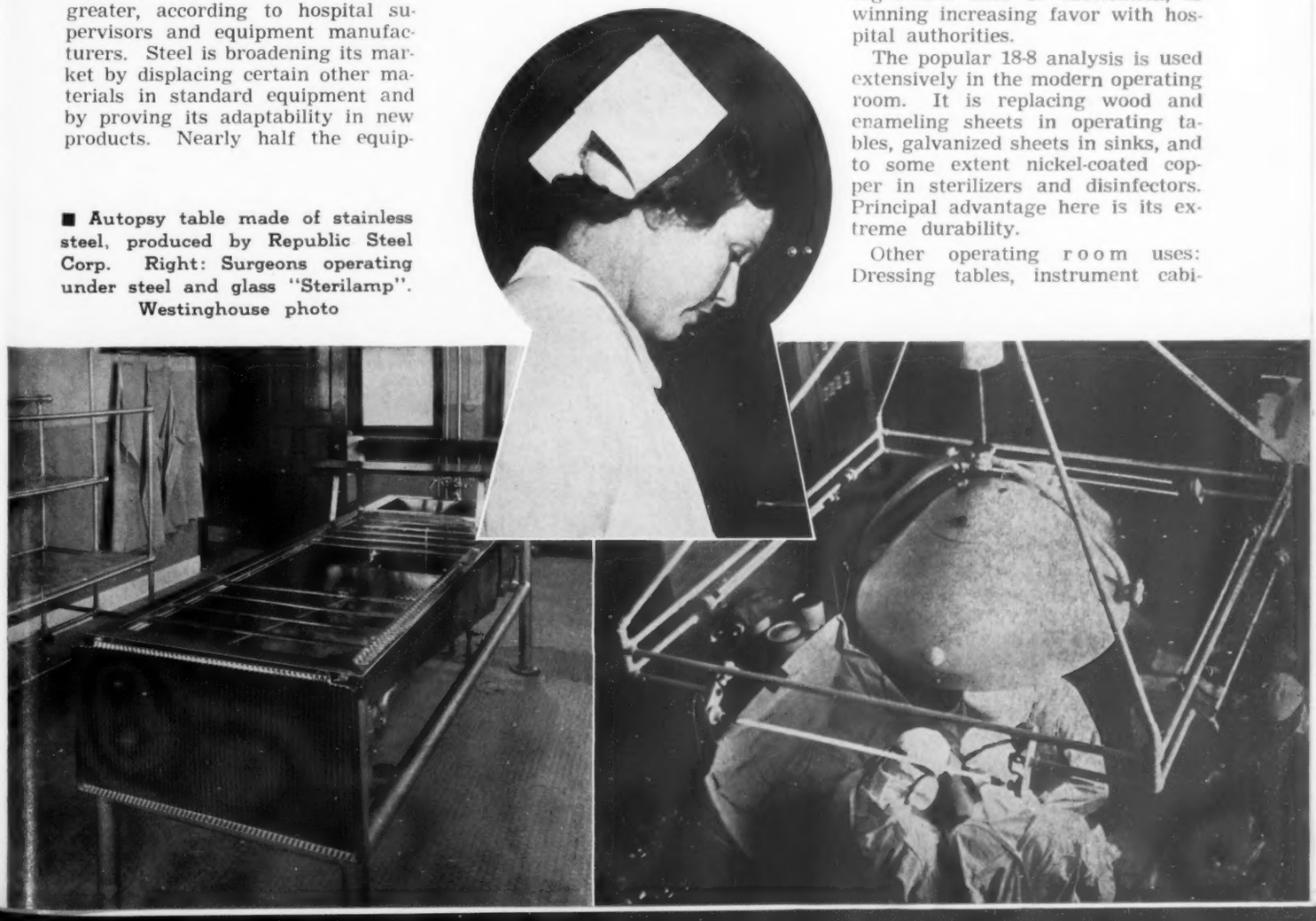
Future demand will be even greater, according to hospital supervisors and equipment manufacturers. Steel is broadening its market by displacing certain other materials in standard equipment and by proving its adaptability in new products. Nearly half the equipment now being purchased is for original use, half for replacement.

For stainless steel over 130 applications already have been found in hospitals, and more are being developed. Not counting future construction, obsolescence and applications yet to be devised, it is estimated production of hospital equipment offers a potential market for 17,000 tons of stainless sheets, strip and light plate.

Stainless steel, for its durability, appearance, corrosion resistance to rust and chemicals, sanitary advantages and ease of fabrication, is winning increasing favor with hospital authorities.

The popular 18-8 analysis is used extensively in the modern operating room. It is replacing wood and enameling sheets in operating tables, galvanized sheets in sinks, and to some extent nickel-coated copper in sterilizers and disinfectors. Principal advantage here is its extreme durability.

Other operating room uses: Dressing tables, instrument cabi-



■ **Autopsy table made of stainless steel, produced by Republic Steel Corp. Right: Surgeons operating under steel and glass "Sterilamp". Westinghouse photo**

nets, dishes, utensils and instruments. Autopsy tables and other hospital morgue equipment are comparatively new applications.

Sanitary facilities for preparing and serving food are mandatory in hospitals and the nickel-chromium steel alloys find ready acceptance in kitchens and cafeterias, are used in counters, tables, refrigerators, dishwashers, ovens, serving trays and cutlery.

Fifteen years ago, 95 per cent of dishwashers were galvanized iron; today 70 per cent are all-stainless steel.

Electrically-heated stainless steel food carts to carry meals through corridors, and cafeteria "thermotainers" to keep freshly prepared food warm are winning a wide market.

A leading manufacturer of food conveyors reports 40 per cent of its line is wholly stainless steel; the remainder, combinations of stainless, zinc-coated steel and aluminum.

Rapid advances in hydro-therapeutics are increasing the use of stainless, already extensive in this application. Hospitals are turning to such curative devices as large underwater therapy tanks, providing hydro-massage and thermostatic control. Children's institutions use whirling leg-bath tanks.

As hospitals move toward more research and experiment, laboratory facilities require more stainless steel for cabinets, counters and apparatus.

Unique applications are noted regularly. Stainless was found the most suitable material for equipment to produce diabetes-treating insulin. A large hospital project in New York recently ordered 20 tons for use in laboratory animal cages.

Diagnostic X-ray equipment, from small mobile units to the most powerful types, requires considerable steel. Hospitals are installing electrical cabinets for fever therapy and deep-heat application. Many are practically 100 per cent stainless steel.

More Steel in X-Ray Units

Significant in X-ray trends has been the development of high-voltage machines for purposes of deep-therapy. Ranging from 140,000 to 1,000,000 volts, such equipment is large and heavy, uses more steel than the older low-voltage units. More than 30 new 400,000-volt X-ray machines now are in hospital service. Self-contained and with parts immersed in insulating oil, these units weigh 3 tons, require 1½ tons of steel.

Hospital elevators, averaging nearly three per institution, are wide and deep with corners rounded to facilitate cleaning. Again the trend is to stainless with some cars taking as much as a ton. Interiors often are finished on ceiling and three sides with stainless sheets or paneled strip.

Miscellaneous hospital utensils and ware, basins, boilers, ladles, irrigators, pitchers and platters also account for a fair volume of stainless.

Intense interest in this metal's applications was evidenced by hospital supervisors at the National Hospital show recently in Dallas, Tex., where leading producers exhibited equipment.

Although the trend to stainless in certain applications is strong, let it not be inferred it monopolizes the field. Equipment exposed to acid fumes and having no other finish than its own grind often is monel metal. Clothing lockers and similar equipment are cold-rolled stretcher-leveled sheets, protected by paint.

Laboratory usage involving direct contact with acids demands copper-bearing, cold-rolled stock, lead-coated. Such equipment often is finished with acid-resistant paint baked into firm bond with the steel.

Wood furniture persists in some hospitals because it seems "home like". Steel, however, is widely used, admittedly being more practical. Grained steel furniture achieves the atmosphere ascribed to wood, a "natural" grain being obtained by printing processes. Stainless steel has been introduced in hospital beds.

Substantial quantities of porcelain enamel sheets go into furniture, cabinets and ware, with recent application noted in operating rooms as finishes for ceilings, doors and wall panels.

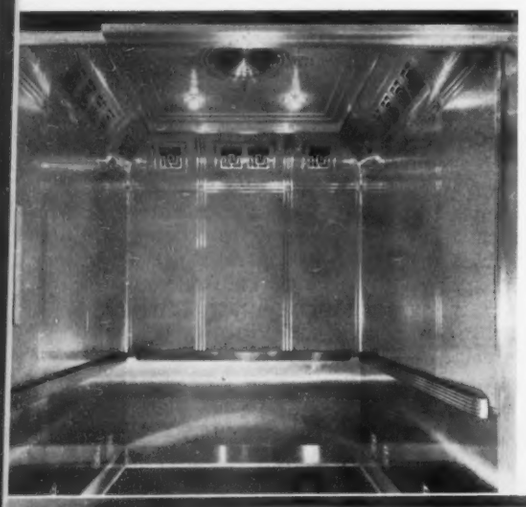
One fabricator of baby incubators reveals use of a new galvanized sheet with a patented fine phosphate coating fused to the zinc surface.

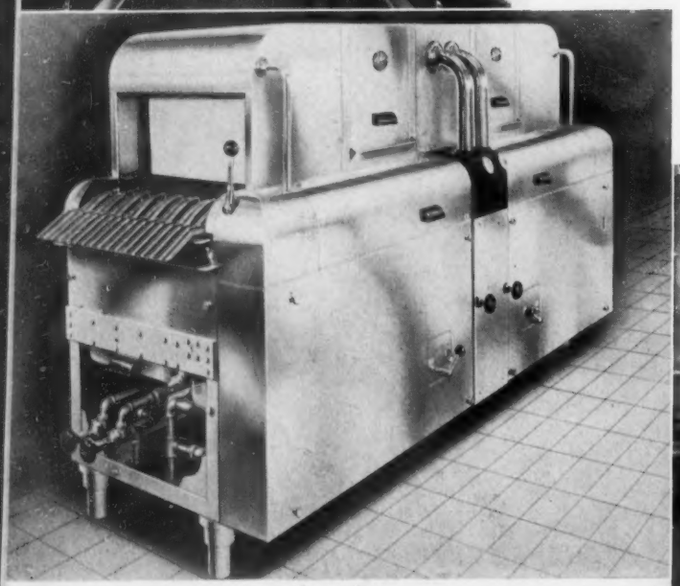
Two out of three institutions now do their own laundering. Washers, dry tumblers, extractors and truck tubs take considerable galvanized steel and castings, some stainless for hoods and trim.

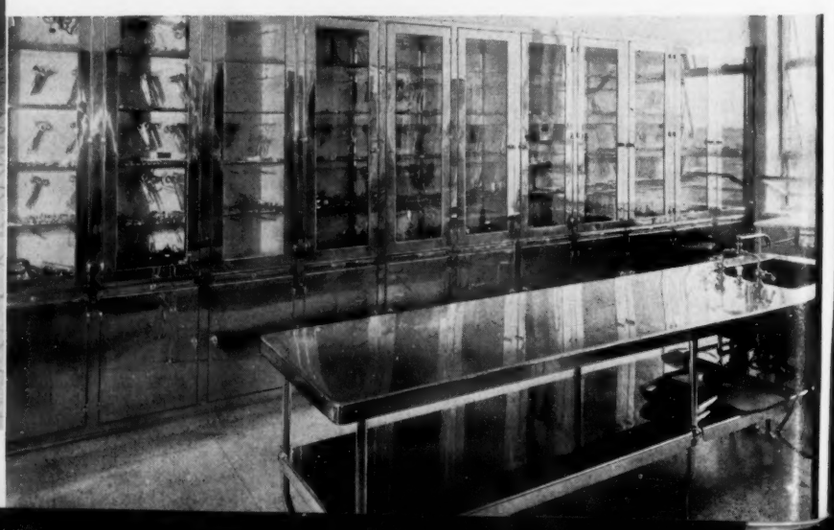
Air conditioning, especially in operating rooms, is deemed essential, and steel, of course, is used in ducts and equipment.

How big a market for steel the

(*Please turn to Page* 96)







■ **Top: Hospital elevator, by W. S. Tyler Co., Cleveland, in which 400 pounds of stainless steel was used. Some cars have been built taking as much as one ton of this steel. Left: Dishwasher, completely stainless; photo courtesy Hobart Mfg. Co., Troy, O. Right: This modern hospital instrument room is finished in and equipped with stainless steel products**

Lose $1.69 Per Ton on Finished Steel

◆ ◆ ◆

Profit Turns to Deficit, at Same Operating Level

■ HOW SHARPLY the "break even" point in steelmaking operations has risen as result of this summer's price reductions is revealed by comparing third quarter financial reports with those for fourth quarter, 1937, when operations were on an almost identical level.

Thirteen producers, representing 87.3 per cent of total ingot capacity, reported aggregate net profit of $9,496,101 in the final period of 1937. Operations for the industry averaged 40.7 per cent of capacity.

The same 13 producers in the third quarter this year reported aggregate net loss of $7,785,423. Third quarter operations averaged 40.8.

In STEEL'S tabular comparison (Oct. 31, p. 13) returns from 14 producers, representing 83.7 per cent of capacity, were presented. In making the present comparison, the returns from two relatively small producers, specializing on alloy steels, have been eliminated, and the subsequent report from American Rolling Mill Co., included, thus affording a still broader, and more representative basis.

Assuming the experience of the 13 producers to be typical, the industry's indicated net loss for the first nine months was $23,774,000. Production of finished steel for sale totaled 14,037,151 gross tons, indicating the industry lost $1.69 for each gross ton of finished steel produced.

Hourly Wages Higher

Hourly wages paid in the steel industry averaged 83.7 cents in the third quarter this year, compared with 82.3 cents in the fourth quarter last year. However, the total payroll cost per ton of ingots produced was lowered from $27.10 to $20.99, as a result of increased operating efficiency.

During the final period of 1937 employment averaged 548,000 working 27.6 hours a week. In the third quarter this year employment averaged 427,000, and 28.3 hours a week. This reduced per-ton payroll costs nearly to the level which prevailed in the early part of 1937.

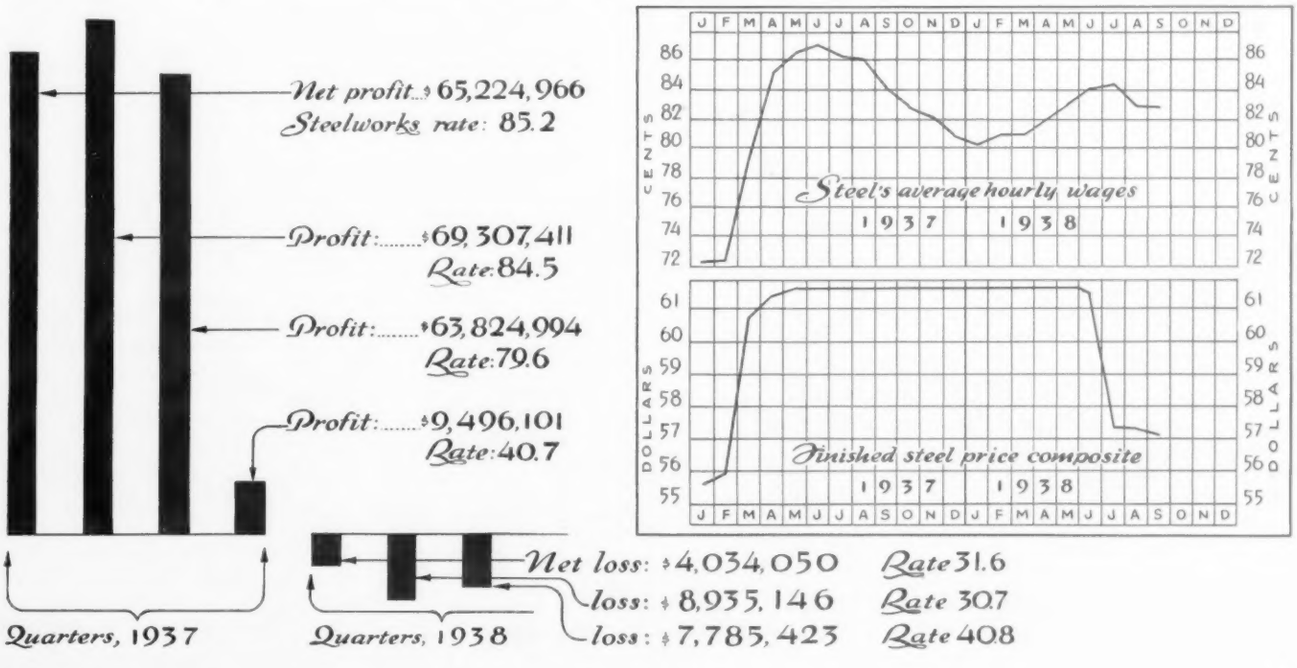
How badly payroll costs got out of line in the early months of the recession is indicated by last December figures when each ton of *ingots* produced cost $35.34 in wages and salaries, while *semifinished steel* (sheet bars and rerolling billets) was quoted at $37, Pittsburgh.

What the industry's "break even" point is at present can be only conjectured. E. G. Grace, Bethlehem Steel Co. president, estimates it to be between 45 and 50 per cent for his company. Several other steelmakers believe theirs is no higher than Bethlehem's, although the average for the industry is understood to exceed it.

In general, prices now are at the approximate level prevailing in the first two months of 1937—before both prices and wages were increased. Average hourly wages continue at peak levels, 14 to 15 per

Steel Earnings, Operations, Prices and Wages

(Earnings are those of 13 identical producers, representing 87.3 per cent of total ingot capacity. Operating rates, entire industry.)



Payrolls for 21 Months Equal to One-Third of Industry's Capitalization

■ FOR EVERY dollar of profit, the steel industry in the past 21 months paid out $6.79 in wages and salaries.

Actual net profits last year were $231,794,000; indicated net loss for the first nine months this year is $23,774,000, leaving $208,020,000 as net profit for the 21 months.

Steel payrolls in the same period totaled $1,412,797,040. This is approximately one-third of the industry's total capitalization, $4,349,800,000.

		Ingot Output Gross Tons	Number of Employes	Total Payrolls	Average Hourly Wages	Average Hours Per Week
1937	Jan.	4,718,436	547,997	$76,423,054	72.5	40.5
	Feb.	4,414 699	556,077	74,277,665	72.8	42.5
	March	5,218,326	577,050	90,863,016	79.3	42.5
	April	5,070,867	589,351	94,321,859	85.6	41.3
	May	5,151,909	595,354	92,931 305	86.6	38.6
	June	4,184,723	555,743	87,519 613	87.7	39.2
	July	4,556,304	593,906	90,549,660	86.8	37.3
	Aug.	4,877,826	603,106	92,663,389	86.1	37.9
	Sept.	4,289,507	602,729	86,160,875	84.3	36.8
	Oct.	3,392,924	586,644	76,191,149	83.1	31.9
	Nov.	2,154,365	551,158	62,119,455	82.1	27.6
	Dec.	1,473,021	508,000	52,062,000	81.7	23.4
1938	Jan.	1,732,764	475,000	47,578,000	80.5	22.9
	Feb.	1,703,726	461,000	45,599,000	81.3	25.0
	March	2,012,406	455,000	51,386 000	81.8	26.7
	April	1,925,166	445,000	47,809,000	82.6	25.6
	May	1,806,805	436,000	46,757,000	83.6	24.4
	June	1,638,277	424,700	46,706,000	84.5	24.3
	July	1,982,058	424,400	45,802,000	84.8	25.6
	Aug.	2,546,988	427,000	52,712,000	83.2	29.4
	Sept.	2,657,748	431,000	52,365,000	83.0	30.0

cent above the January, 1937 average.

Undiminished costs, depressed operations, and recently, reduced prices, make the first nine months this year highly unfavorable compared with the period in 1937. Indicated net loss for the industry this year to Sept. 30 has been nearly $24,000,000, in contrast with about $220,000,000 net profit in the corresponding period last year.

Steel employes also have suffered. In the first nine months last year payrolls totaled $785,511,000; in the first nine months this year, $436,714,000, a loss to workers of $348,797,000.

Trend in employment, payrolls, and operations, however, is upward. September employment averaged 431,000, or 4000 above the August average.

Hourly earnings of wage-earning employes during the past two years have risen to 27 per cent above the average wage in all manufacturing industries, the greatest spread on record, according to the American Iron and Steel institute.

Steel employes earned an average of over 82 cents per hour in the past two years, which compares with average earnings of a little less than 65 cents per hour for workers in all manufacturing industries.

AMERICAN ROLLING MILL HAS LARGER QUARTERLY LOSS

American Rolling Mill Co., Middletown, O., reports a net loss of $556,994 for third quarter, compared with $525,854 loss in the second, and a net profit of $2,646,525, or 79 cents a common share, in the third quarter last year. Nine months' net loss this year totals $1,280,159, against net profit of $9,289,296, or $3.09 a common share, in the period last year.

GRANITE CITY STEEL

Granite City Steel Co., Granite City, Ill., reports third quarter net profit of $18,559, equal to 5 cents a share.

In the June quarter it had a net loss of $116,640. Net profit in the third quarter last year was $140,541, or 37 cents a share. Its nine months loss this year aggregates $253,174 against net profit of $464,036 in the period last year.

COLORADO FUEL & IRON

For the three months ended Sept. 30, Colorado Fuel & Iron Corp., Denver, reduced its net loss to $143,752, from $390,863 reported for the June quarter. A net profit of $442,080 was reported for third quarter last year.

CLEVELAND-CLIFFS IRON

Cleveland-Cliffs Iron Co., Cleveland, reports for third quarter net profit amounting to $329,820, or 68 cents a share on the $5 preferred stock, against a net loss of $51,039 in the second quarter, and a net profit of $2,231,803 in the September quarter last year. In the first nine months the company showed a net profit of $207,562, compared with $4,104,171 net profit in the period last year.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Nov. 5	Change	Same week 1937	Same week 1936
Pittsburgh	45	+ 3	41	70
Chicago	56.5	+10	42	76
Eastern Pa.	35	+ 1	38	47.5
Youngstown	63	+ 2	51	74
Wheeling	59	None	54	89
Cleveland	77	+ 3	54	79.5
Buffalo	51	+ 2	23	84
Birmingham	68	+11	54	67
New England	71	+16	30	88
Cincinnati	75	+ 5	44	91
St. Louis	45.5	+ 2.5	42.4	65
Detroit	85	+ 3	90	100
Average	57.5	+ 3	47	73

PRODUCTION

■ STEELWORKS operations last week increased at 11 producing centers and remained stationary at one. The national rate is estimated at 57.5 per cent, up 3 points, the highest since mid-October, 1937, when it was 63 per cent.

Youngstown, O.—Changes in active furnaces last week resulted in a gain of 2 points to 63 per cent. Fifty-five open hearths, two bessemers and 13 blast furnaces were operating. For this week 66 per cent is scheduled, with 57 open hearths and three bessemers. Youngstown Sheet & Tube Co. started a bessemer Friday night for a four-day run and will add two bessemers at Brier Hill works. Another blast furnace is expected to start this week.

Cleveland—Addition of an open hearth by Republic Steel Corp., making 12 of 14 active, lifted the rate 3 points to 77 per cent. The same interest blew in another blast furnace late last week.

Birmingham, Ala.—Advanced 11 points to 68 per cent, with 15 open hearths active. Tennessee Coal, Iron & Railroad Co. is operating 10 of 18 open hearths, and all its blast furnaces. Another open hearth is scheduled to go in during November.

St. Louis—Gained 2.5 points to 45.5 per cent. Two more open hearths are scheduled to go in this week at an east side mill.

Detroit—Up 3 points to 85 per cent as Ford Motor Co. put on a fifth furnace. At the end of the week 21 of 25 furnaces were in operation.

New England—An increase of 16 points brought the rate to 71 per cent, highest of the year, with one

producer operating all furnaces.

Cincinnati — At 75 per cent, the best rate this year, production was 5 points above the preceding week.

Pittsburgh—Rose 3 points to 45 per cent, on gains at various plants.

Wheeling—Unchanged at 59.

Central Eastern seaboard — Further additions to active furnaces caused a rise of 1 point to 35 per cent.

Buffalo—Lighting of another open hearth lifted the rate 2 points to 51 per cent.

Chicago—Up 10 points to 56.5 per cent. One interest operated at 12 points higher and another at 7 points above the preceding week. Two blast furnaces also were blown in.

Picket To Collect Dues

■ Dues-collecting pickets last week blocked gates to three Jones & Laughlin Steel Corp. plants to delinquent SWOC members and workers who had no union cards. Sporadic fighting occurred.

After four hours the demonstration was called off. One union official said: "There was some uncalled for violence on the picket lines."

Japan, Closing Door to Finished Steel, Takes Heavier Scrap Tonnage

NEW YORK

■ LAST WEEK, Japan bluntly announced that it intended to create a political and economic bloc which would include the Japanese Empire, Japanese-dominated Manchukuo and China, now in the process of being subordinated. In other words, Japan will practically close the "open door" in China for the products of the United States and other nations.

It is indicated Japan will continue to be an important customer of United States for raw materials and industrial equipment, but that its purchases of finished products will show further shrinkage. Japan is a large buyer of pig iron and scrap, as indicated by September shipments alone of 59,833 and 58,979 tons, respectively. Currently, Japan also is making substantial purchases of copper, lead and zinc in the United States. It is practically the only outlet for tin plate scrap, the September total being 1578 tons. Japan no longer is a customer of American tin plate mills. In fact, it now is competing with the United States in other markets, including Latin America.

This year the nation took large tonnages of plates, carbon bars and railroad materials both for the home country and Manchukuo. Lately, Japanese purchases have tapered off sharply as indicated by the September movement of representative products: Carbon bars 427 tons, cold rolled strip 402 tons, hot rolled strip 401 tons, plates, 217 tons, heavy rails 202 tons, and shapes 84 tons.

It is indicated that steel producers in the United States will get still less business in the Far East, especially when Japan completes its domination of China. The Showa Steel Works of Manchuria has been placed under the control of the ministry of finance, Bank of Japan, and the Industrial Bank of Japan. It is also understood this works is being equipped with a 56-inch hot and cold continuous strip mill. It was reported several months ago that Japan had bought an 80-inch hot and cold strip mill for installation in Japan proper.

Germany is said to be benefiting substantially from her alliance with the Nipponese in the sale of steel and other products.

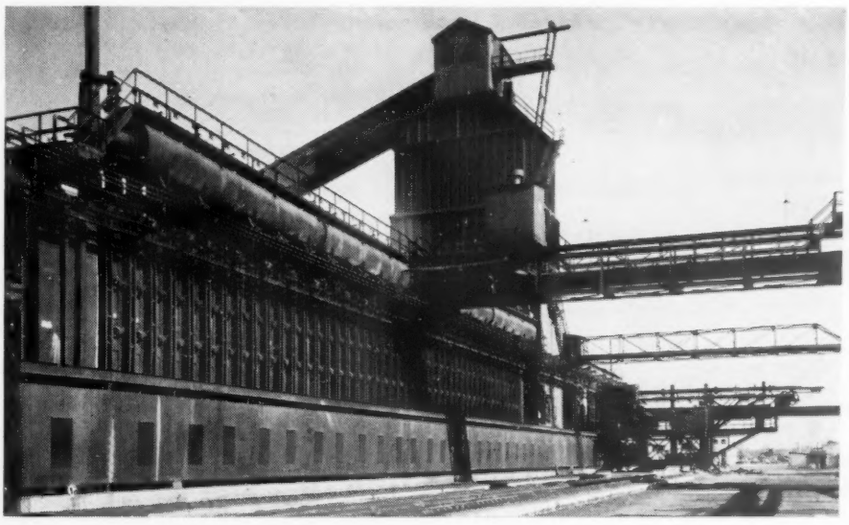
Reports from Manila are to the effect that two Philippine mines now are shipping ore to Japan and that a third will be ready to begin shortly. Japan and Germany are studying the Philippine market for finished steel, which is by far the most important Far Eastern outlet for American mills, not excepting Oceania.

Placed 160,000 Tons of Scrap

Last week, also, Japan quietly placed 160,000 tons of No. 1 and No. 2 scrap through its trading companies in the United States, of which six are said to have participated. The latest purchase was negotiated on the basis of $14.75, f.a.s., for No. 1 steel and $13.50 for No. 2. The most recent purchases, for November and December shipment, will be delivered from Atlantic seaboard and Gulf ports, as accumulations on the West coast have been fairly well absorbed.

Japan is by far the largest customer of the United States for scrap. During the first nine months of 1938 it took 929,756 tons of a total 2,160,279 tons. The United Kingdom was second with total receipts of 389,976 tons, but now is completely out of the picture, having taken none since July. In fact, it has resold scrap to

Large Capacity Coke Ovens Installed at Hamilton



■ Fifteen low-differential, underjet, basement-type combination Becker coke ovens were placed in operation at American Rolling Mill Co.'s Hamilton, O., plant last week. They were built by the Koppers Co., Pittsburgh, and represent an investment of approximately $500,000.

Each oven has a capacity of 622 cubic feet, is 40 feet 8 inches long between doors, 12 feet 6 inches high, with an average width of 16 inches, and will hold approximately 15.5 tons of coal. Maximum coke output is about 27 tons per oven per day.

As the plant already operated 45 ovens, the total now is 60. The illustration shows the complete battery, the new units being at the far end.

The addition is reported to be the first installation of this type of large capacity ovens in the United States. It embodies many improvements. All reversing equipment is placed in a basement-like structure below ovens. This facilitates operation and inspection and improves working conditions for the men.

Germany. Shipments to other leading takers of American scrap in the first nine months of this year were: Italy, 268,165 tons; the Netherlands 139,242; Germany 165,801; Poland 120,340 and Belgium 16,702. Czechoslovakia received 14,984 tons, most of which was shipped in February and March.

The International Scrap convention, commonly known as the scrap cartel, will meet in London Nov. 15 to discuss additional scrap purchases. At the meeting held early in October, purchases from Holland and France were authorized but none from the United States. However, Hungary made a private purchase of 40,000 tons at a price reported to be $14.50 f.a.s.

Japan Combs U. S. Rim

The breakdown of the September statistics shows that Japan has skimmed practically the entire rim of the United States for scrap materials. Shipments to Japan by custom districts in gross tons along with dollar valuation follow: New York 19,856 tons, $277,855; Philadelphia 218, $4300; Maryland 10,476, $160,007; Virginia 969, $16,952; Florida 4701, $63,870; Mobile 116, $2000; New Orleans 1406, $20,306; Galveston 2269, $30,424; Los Angeles 3433, $49,584; San Francisco 1739, $21,645; Oregon 8963, $132,526; and Washington 4833, $71,968.

Scrap exports to other nations have been confined principally to the Atlantic seaboard and Gulf ports. Movement to Italy on the same comparative basis was Rhode Island 4578 tons, $42,164; New York 3471, $52,163; Mobile 2531, $92,971; New Orleans 5024, $60,934; Galveston 12,020, $170,274. The breakdown for Germany was: Maine 2750 tons, $40,987; New York 13,696, $184,882; South Carolina 984, $10,644; Georgia 397, $4367; and Florida 2606, $29,565.

The Netherlands took practically the same tonnage as Germany in September with shipments from the following districts: Massachusetts 10,448 tons, $115,583; New York 2606, $35,470; Philadelphia 2588, $22,298; Virginia 33, $680; North Carolina 2428, $23,458; Georgia 1041, $11,500.

Shipments to Poland were: Philadelphia 25 tons, $950; North Carolina 588, $42,328; New Orleans 1316, $18,424; Sabine 953, $11,436; and Galveston 5670, $66,035.

Reports in Drug Stores

■ Liggett Drug Stores, New York, are offering certain back copies of the American Iron and Steel institute's annual statistical report at 19 cents each. At one downtown store last week copies for 1914, 1917, 1924 and 1932 were noted on the bargain counters.

Activities of Steel Users, Makers

■ BIRDSBORO Steel Foundry & Machine Co. has purchased from the Reading Iron Co., Reading, Pa., a portion of its plant known as the Scott foundry department, which the Birdsboro company has been operating under lease.

♦

Eclipse Aviation, division of Bendix Aviation Corp., has moved offices and factory from East Orange, N. J., to a new plant at Bendix, N. J.

♦

General Alloys Co., Boston, has appointed Walter Gerlinger Inc., 610 West Michigan street, Milwaukee, its representative in Wisconsin.

♦

Liquidation of the machinery of the Pittsburgh Valve Foundry & Construction Co., Pittsburgh, is now being conducted by Samuel Lunenfeld, sole owner.

♦

Specialty Steel Co., 149 Water street, New York, has been organized by George Robinson, formerly of Patriarche & Bell, New York. The company will handle high carbon and alloy spring steels.

♦

National Metal Processing Co., 6703 Park avenue, Cleveland, has started operations, specializing in the manufacture of rectifiers and arc-welding equipment. R. E. Weir is vice president.

♦

H. O. Bates, 68 Barclay street, New York, manufacturer of marking devices and numbering machines, has opened a new office and plant at 251-257 North Broad street, Elizabeth, N. J.

♦

Northwestern Steel & Wire Co., Sterling, Ill., has been licensed to produce Ledloy, lead-bearing steels, under patents held by Inland Steel Co., Chicago.

♦

Erie Enameling Co., Erie, Pa., has placed contract with Ferro Enamel Corp., Cleveland, for porcelain enameling furnace, to be equipped with a 5 x 12-foot high-sidewall Norton alundum super-refractory muffle.

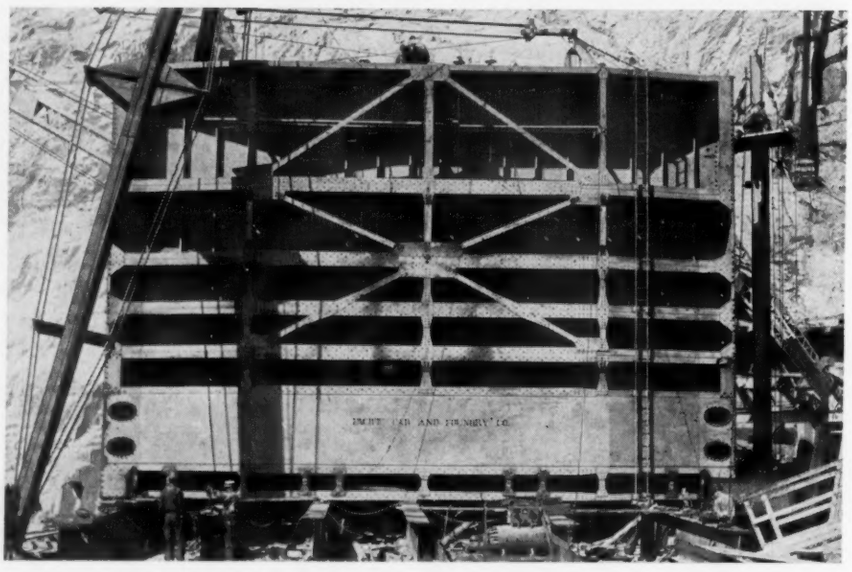
♦

Taft-Peirce Mfg. Co., Woonsocket, R. I., has appointed John E. Livingstone Co., 7310 Woodward avenue, Detroit, exclusive sales representative in Michigan for the products of its small tool and gage division. J. B. Rousseau, Detroit district sales manager for Taft-Peirce, will make his headquarters at the same address.

♦

Aetna-Standard Engineering Co., Youngstown, O., has taken over the Griffiths-Bowman Engineering Co., Massillon, O. Frederick J. Griffiths and K. Bert Bowman, president and vice president, respectively, of the Griffiths-Bowman company, are now associated with the Aetna organization.

Steel Blocks Swift Columbia River



■ **Seventy tons of steel was required in this gate to block a diversion slot in Grand Coulee dam on the upper Columbia, eastern Washington. Fabricated by the Pacific Car & Foundry Co., Seattle, the gate was floated into place by barge**

Firm National Policy on American Foreign Trade Urged By Council

■ SPREAD of economic nationalism, rise of totalitarian states and possible adverse effects on the United States foreign trade were considered at the twenty-fifth convention, National Foreign Trade Council Inc., New York, Oct. 31-Nov. 2.

James A. Farrell, council chairman, and former president, United States Steel Corp., presided at opening and closing sessions and the world trade dinner. Nearly 1200 importers, exporters, bankers, shipping men and others attended the sessions.

Mr. Farrell warned against halfhearted measures in protecting the United States' foreign trade. A conciliatory attitude, he said, encourages on the part of some other nations aggressive action and violation of agreements, designed to exclude American exporters from foreign markets.

He suggested that as a nation we have been too patient where our interests have been assailed. This patience, in recent events, may have been taken for weakness. Mr. Farrell declared it encouraging to note that American protests against invasion of American rights have taken a firmer tone.

A bronze statuette and a bound volume of hundreds of letters of tribute were presented to Mr. Farrell at a luncheon commemorating his 25 years as council leader. Myron C. Taylor, director and former chairman, United States Steel Corp., paid him special tribute at the luncheon.

Urge Currency Stabilization

Secretary of State Cordell Hull, speaking at the world trade dinner, declared the drift toward self-sufficiency is meeting obstacles and that the major part of world trade is carried on by countries not attempting to be self-contained regardless of cost. He reiterated determination to follow a policy aimed at building up international commerce and reciprocal trade agreements.

Monetary stabilization and reduction of tariff barriers as needed were urged by W. Randolph Burgess, vice chairman, National City Bank of New York, and Winthrop W. Aldrich, chairman, Chase National bank, New York. Speaking by transatlantic telephone from Berlin, Mr. Aldrich criticized efforts to control currency artificially, said money rates should tell the story of supply and demand for capital.

"Governments," he said, "must not mask the true situation by creating bank funds through money manipulations."

A round-table discussion on credit and exchange conditions abroad disclosed barter transactions by Germany in Colombia and several other Central and South American countries were cutting into American exports.

Recent events in Europe and the Far East tend to hamper American trade in several countries, said Rev. Edmund A. Walsh, regent, School of Foreign Service, Georgetown university, Washington. Central European countries, he said, are being drawn into the orbit of German trading influence with the result reciprocal trade agreements with other nations may be sterilized or neutralized.

Japan, he declared, virtually has ended trade United States formerly had with China. Germany hopes to dominate the Latin-American markets.

Favors Pan-Americanism

Part of the 14 billion dollar gold reserve held by this country might be used to stabilize Latin-American currencies and create new channels for the exports of capital goods, suggested Marcus Nadler, professor of finance, New York university. European nations will arrange to supply capital goods unless the United States places capital at disposal of the countries to the south, he warned.

Warren L. Pierson, president, Export-Import bank, government agency to help finance export trade, spoke in favor of a positive Pan-Americanism policy as a means of retaining and enlarging those markets.

Increasingly bitter competition between the two world economic systems was predicted by Richard C. Patterson, assistant secretary of commerce. Mr. Patterson urged preparation for an emergency.

United States' Share in World Tin Plate Drops

■ United States' share in world tin plate production fell from 59 per cent in January-August, 1937 to 48 per cent in the same period in 1938, according to the International Tin Research and Development council. World output in these eight months was 1,846,000 gross tons, 38 per cent less than 2,986,000 tons in corresponding months of 1937.

Eight months' consumption this year was 102,300 tons, 21 per cent less than in eight months last year. United States' consumption dropped 40.9 per cent, from 57,556 tons to 33,998 tons; United Kingdom 34.9 per cent, from 18,121 tons to 11,790 tons. Germany increased consumption 13.3 per cent from 7836 to 8878 tons; Japan 10.4 per cent from 5642 to 6230 tons; Italy 54.1 per cent from 2137 to 3294 tons, and Poland 56.2 per cent from 824 to 1287 tons.

The United States bureau of mines reports consumption of 90,130 gross tons of primary and secondary tin in the United States in 1937, compared with 83,050 tons in 1936. Of the 1937 total 72,928 tons were virgin tin, 7 per cent more than 68,232 tons in 1936. Secondary tin used in 1937 totaled 17,202 tons, 16 per cent more than 14,818 tons in 1936.

Company Organized To Manufacture Glass Fiber

■ Revolutionary changes in many types of electrical devices are forecast in an announcement by new Owens - Corning Fiberglass Corp., which will have headquarters in Toledo, O., plants in Newark, O., and Corning, N. Y.

The company has been formed by Owens-Illlinois Glass Co. and Corning Glass Works to put into many new fields of application the glass fiber and glass textile developed by the two companies at a cost of more than $5,000,000.

One of the most important applications is insulation for electric motors. Great savings in weight, more compactness, and ability of equipment to stand 100 per cent overload are reported as some of the results attained.

Harold G. Boeschenstein, former vice president and general manager of Owens-Illinois Glass, is president of the new company, and Amory Houghton, president of Corning, will be chairman of its directorate.

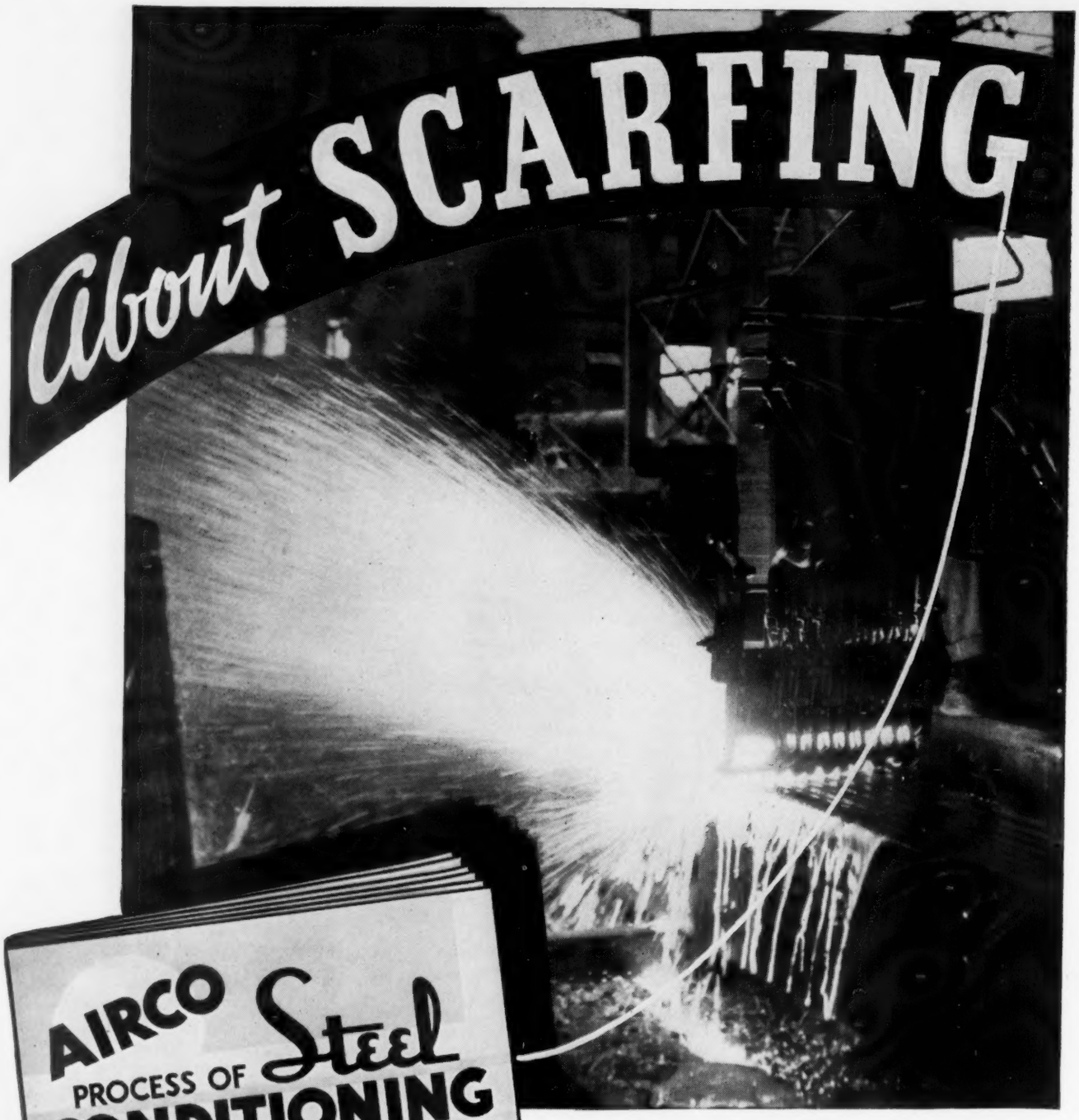
Fewer Blast Furnaces, but More Capacity, Employes

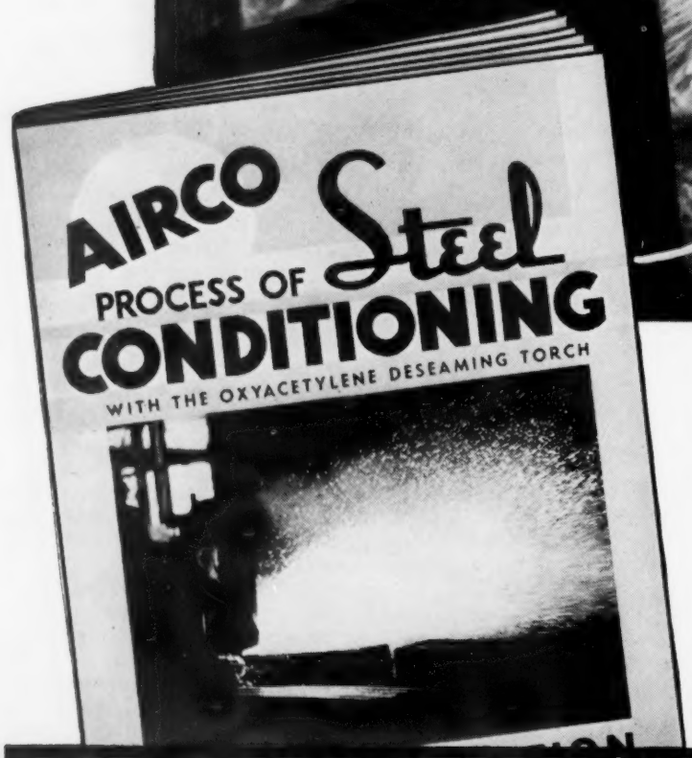
■ The steel industry today has 60 per cent fewer blast furnaces than 50 years ago, but has increased the capacity about 300 per cent, according to the American Iron and Steel institute. This gain is attributed to technical progress in furnace construction and operation.

In 1899, 575 blast furnaces were available for pig iron and ferroalloys with annual capacity of 13,168,000 tons. This year capacity is about 51,221,000 tons, although the number of furnaces has decreased to 236.

Over a period of almost 50 years the number of employes in the steel industry has nearly tripled, despite this sharp reduction in furnaces.

About SCARFING





Every practical steel producer will want this book, will be intensely interested in the wealth of photographic illustrations and pages of AIRCO flame scarfing—the modern development for surface conditioning of steel blooms, slabs and billets.

Just off the press and waiting for your request. Write *now*.

AIR REDUCTION SALES COMPANY
General Office: **60 East 42nd St., NEW YORK**

WINDOWS OF WASHINGTON

BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ FOLLOWING a conference with the President last week, John J. Pelley, president, Association of American Railroads, told newsmen the White House is willing to back a legislative railroad aid program at the next session of congress. The President confirmed the Pelley statement by implication at a press conference.

Last week it was reported the President would back such a program provided the railroads accepted the special committee's decision in the wage reduction controversy. Even those who are strong for the railroads say that in view of the way in which the case was presented by the railroads, the committee handed down the only decision possible.

AFL's William Green said his organization was willing to back the railroad owners in a rehabilitation program before congress, but if railroad management did not accept the committee's decision, the AFL would stand back of railroad labor.

Backs Roosevelt's Rail Stand

Said Mr. Green: "The President has pointed the way out. He has urged railway management to drop its insistence on a wage cut and concentrate on a legislative program for rehabilitation of the railroads to be acted upon at the coming session of congress. Railway labor and the American Federation of Labor will give their whole-hearted support to such a legislative program. The responsibility now rests upon the railroad operators and managers. We hope they will arrive at a wise decision."

It is expected the commission, appointed by the President to plan a legislative program, will meet again in the near future. The commission made up of an equal number of representatives of management and labor, adjourned in September, after holding one meeting, so that the labor representatives could devote their inquiries to the wage controversy. Management was represented on the commission by Carl Gray, chairman, Union Pacific railroad; M. W. Clements, president, Pennsylvania railroad; and Ernest C. Norris, president, Southern railway. Labor's representatives were George M. Harrison, chairman, Railway Labor Executives' association; B. M. Jewell, president, American Federation of Labor's railroad employes department; and D. B. Robertson, president, Brotherhood of Firemen and Enginemen.

5.5 PER CENT DEPEND ON FOREIGN TRADE

Tabulations by the bureau of foreign and domestic commerce show that 67,000 persons in the iron and steel industries and their products were engaged in the production and distribution of goods for export in 1929. In 1933 the estimated number was 28,000 and in 1935, 40,000. No estimates are yet available for 1937 by industries.

In 1937, however, it is estimated that approximately 2,400,000 persons, equivalent to some 5½ per cent of all gainfully employed in the United States, made their living from activities depending on exporting. This was an increase of 312,000 over 1935 but was still nearly 800,000 below the 1929 level.

LACK OF FUNDS WORRIES WAGE-HOUR ADMINISTRATOR

Apparently worrying Elmer F. Andrews, administrator for the hours and wages law, is lack of sufficient funds to go ahead with his organization.

Mr. Andrews last week conferred with the President at the White House. Also attending were Budget Director Daniel Bell, Secretary of Labor Perkins, Richard Saunders, assistant to the secretary, Charles O. Gregory, labor department solicitor, and Hampton Magruder, general counsel for Andrews.

Congress provided an appropriation of $400,000, which Andrews claims is not nearly enough. Efforts were made at the conference to find a way to transfer money to the hours and wages division, but apparently this was not successful. The only alternative seems to be the loan of personnel by other government departments to Mr. Andrews' division until congress grants a deficiency appropriation.

Due to the shortage of funds, the administrator has been able to appoint only one industry committee, the textile, because each of the members of the committee are allowed a per diem of $15 and Mr. Andrews has not felt he would be justified in creating additional committees.

On the basis of a minimum of 25 cents an hour and a 44-hour week, there have been fewer complaints and complications from industry than had been anticipated. There are, of course, many rough spots to be smoothed out, but Mr. Andrews has expressed himself, at recent press conferences, as being well satisfied with the way the law is working out.

LITTLE BUSINESS URGES LABOR ACT REVISION

Prompt revision of the national labor relations act was advocated last week by the American Federation of Little Business, national organization of independent small business men.

The federation, according to Tyre Taylor, its general counsel, would amend the act "to put an end to the board's power to act as prosecutor, judge and jury, to permit employers

as well as employes to invoke its aid, and to extend and develop greater reliance upon the processes of mediation."

Terming recent "constructive criticism" of the act by Donald R. Richberg, former head of NRA and author of the railway labor act, as "both timely and helpful," Taylor declared:

"Little business notes with satisfaction the efforts of a trusted and experienced friend of labor to remedy some of the deficiencies of the Wagner act—for there are deficiencies in it, and in its administration.

"The difficulty has been, and is," he continued, "that the national labor relations act had to be drawn to cover excesses and abuses practiced only by a minority. The authors of the act did their work well, and the national labor relations board has enforced the act fearlessly in curbing such abuses. But the majority of employers are not guilty of excesses, and there is a minority among the labor groups that is as much given to excesses as is the minority of employers. The one-sidedness of the act, cited by Mr. Richberg, applies restrictions to all employers alike, and leaves them all vulnerable to the excesses of labor. These hardships fall upon little business with disproportionate weight."

MONOPOLY PROBE HEARINGS MAY START THIS MONTH

Date for the first hearing of the national economic committee, which is investigating the monopoly situation, has not yet been set officially. In Washington last week it was reported a tentative agreement had been reached by members of the committee to begin the hearings between Nov. 15 and Dec. 1.

Although it has not been announced what witnesses and subjects will be taken up first, there is a general belief Leon Henderson, committee secretary; Dr. Willard Thorp, of the department of commerce; and Isador Lubin, of the bureau of labor statistics, will be the first witnesses.

It is reported unofficially that these men will take at least a week to lay the ground work for the hearings. They have been selected, it is believed, because committee members believe government officials, working on various phases of the study, should be called at the beginning of the hearing to present a broad picture of aims and purposes.

CIO SHIPYARD STRIKERS APPEAL TO COMMISSION

Between 300 and 400 striking welders at the Federal Shipbuilding & Dry Dock Co., Kearny, N. J., subsidiary of United States Steel Corp., have turned to the United States maritime commission for support in their demands. They went on strike Oct. 31 against what they called an "inhuman speed-up system." The strikers are members of the CIO's marine and shipbuilders' division.

Shipyard officials say the strike is in violation of a contract signed last May, which, they declare, forbade stoppage of work before mediation had failed.

At a recent meeting of the strikers a committee was authorized to call a general walkout of the plant's 4000 employes "if and when it was deemed necessary." The yard at present is engaged largely in navy construction.

WILL PRODUCE MANGANESE BY NEW PROCESS

Bureau of mines officials have announced two companies in the United States soon will begin producing metallic manganese by a process developed by the bureau's metallurgical division.

Officials of both branches of the national defense long have considered that one of the serious situations facing this country from the standpoint of defense is the fact the United States is dependent on foreign sources for high-grade manganese ore.

In 1937 the United States imported more than 900,000 tons of manganese ore, 42 per cent of the total coming from Russia. Only important sources of high-grade ore in this hemisphere, to which America could be reasonably certain of access in case of war, are Cuba and Brazil, which last year furnished 22 per cent of this country's manganese imports.

Domestic ore output for the same period was only 26,000 tons, testing 35 per cent or more manganese.

The electrolytic process worked out by bureau of mines experts is said to convert low-grade manganese ore, found in abundance in the United States, into 99.7 per cent pure manganese metal. The cost of the new method does not at present make it an economically justifiable substitute for importation of high-grade foreign ores in peace-time, the bureau points out, but the vital importance of an assured manganese supply in an emergency has led to licensing of two companies for small-scale, experimental production.

A skeleton industry employing the electrolytic process, must be built up now, bureau officials say, to guarantee the speed of a shift to large-scale production whenever necessary. Private firms using the process are expected first to concentrate on production of certain alloys rather than steel itself.

The metallurgical division, working first in a laboratory at Reno, Nev., and now at Boulder City, Nev., so far has manufactured slightly more than 1000 pounds of the pure manganese, under conditions which do not necessarily provide a fair test of production costs.

The new method dissolves manganese from low-grade ore and then deposits it from the leached solution by electrolysis, after which the metallic manganese is stripped from the stainless cathode upon which it is deposited.

Patent for the process is administered by the secretary of the interior, whose policy is to license production, free of charge, by responsible firms prepared to accept certain stipulations of the bureau.

Low-grade manganese is present in nearly every state.

PWA CONSTRUCTION TO START BEFORE JAN. 1

With almost $1,700,000,000 worth of federal and non-federal projects approved under the new 1938 program PWA is concentrating attention on a drive to put all construction under way as soon as possible.

Under the law, all PWA projects must be under construction by Jan. 1, 1939. This is the second deadline set up by the law, and all efforts of the organization between now and the first of the year will be devoted to meeting this requirement.

The first deadline required no further applications be accepted after Sept. 30. PWA met that by handling requests for 12,807 projects involving more than $4,000,000,000 worth of construction in 101 days.

GOVERNMENT IRON, STEEL CONTRACTS TOTAL $230,433

For the week ending Oct. 29, the government awarded contracts for iron and steel and their products totaling $230,432.91. These awards come under the Walsh-Healey act, and the items include the following: Montana Culvert & Pipe Co., Missoula, Mont., $11,456.47; United States Pipe & Foundry Co., Los Angeles, Calif., $22,242.50; United States Pipe & Foundry Co., Philadelphia, $34,131.15; the Timken Roller Bearing Co., Steel & Tube Division, Canton, $15,626.19; Taylor-Davis Inc., Philadelphia, $11,101.60; the Titusville Iron Works Co., New York, $35,560.00; Majestic Mfg. Co., St. Louis, $15,831.00; the Phoenix Bridge Co., Phoenixville, Pa., $15,366.00; Belmont Iron Works, Philadelphia, $28,485.00; International Steel Co., Evansville, Ind., $28,133.00; and Brunner & Lay, Chicago, $12,500.00.

ASKS STATEMENT ON TRADE AGREEMENT NEGOTIATIONS

American Tariff league has requested the state department to make an explicit statement on the pending trade agreement with the United Kingdom to clear up "uncertainties and confusion."

"Bethlehem Steel and the Public"— Problems Are Explained to Employes

■ A BROAD picture of the Bethlehem Steel Corp., in its relations to employes, public, and other industries, including a history of the growth of the company and the outlook for the future, is presented in the current 12-page issue of *Bethlehem Review,* employes' bulletin.

Taking the position that the public relations of modern industry concern the employes as well as the management, E. G. Grace, president, elaborates on this philosophy.

"Our activities as managers and employes, like the activities in other large companies, have a marked effect on the prosperity of our immediate communities and on the well-being of the public at large," he says.

"A responsibility to the community has always been recognized by the Bethlehem Steel organization, both management and employes."

Among the facts published for the first time is a survey showing that Bethlehem's purchases from general suppliers amounted to more than $140,000,000 in the past year.

For the first time a calendar of growth is presented, showing the concern increased from 7500 employes in 1905 to 88,000 as of Jan. 1 this year; from 190,000 tons ingot capacity to 10,042,000 currently; from an initial investment of $40,000,000 to $666,000,000.

Bethlehem's huge inventory figure of $104,000,000, characteristic of steel, is elaborated on. This mainly includes ore piles and many other items necessary to supplying sudden demands, rather than finished steel.

A note of optimism for further growth is suggested in the final article "Building for the Future." Commenting on the corporation's recently completed $90,000,000 program and the fact that it spent in the 15-year period 1923-1938 a total of $332,000,000 for additions and improvements, it states "the Bethlehem management prefers to regard the structure of today as only a foundation for the greater institution of the future."

It is brought out the personnel is active in service clubs, welfare societies and fraternal bodies, and the company is a supporter of hospitalization, public health, education, recreation and other civic activities. For more than a decade the corporation has had a pension plan for employes, and the employes' relief plan paid out more than $1,000,000 in the past year.

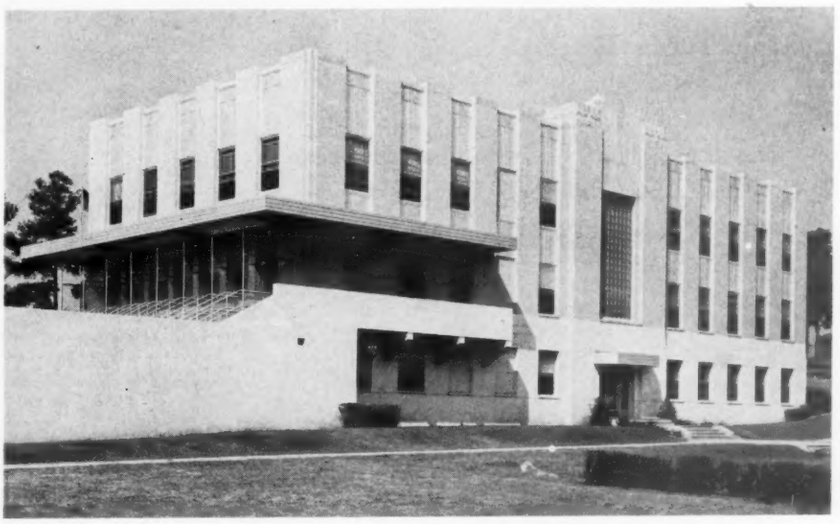
While recognizing the value of a wide range of community work, the *Review* comments: "The fundamental general welfare depends on good business conditions, good markets, and the uninterrupted flow of production."

TELLS EMPLOYES HOW $17,000,000 DEBT WAS PAID

With the payment of the last note Nov. 1, Oliver Farm Equipment Co. announced through its chairman, C. R. Messinger, the complete retirement of an old indebtedness which at the end of 1930 totaled nearly $17,000,000.

"It was the wholehearted willingness of banks to co-operate which enabled the company to continue in business and thaw out millions of dollars in frozen assets so that the debt was paid in full without a complete loss of the stockholders' equity," he told employes at a celebration dinner in Chicago.

Wide Terrace Leads to Long Row of Payroll Windows



■ **This beautiful structure is the general office building at Tennessee Coal, Iron & Railroad Co.'s new tin plate mill, Birmingham, Ala. It is a harmonious combination of gray brick, gray cast stone, and moulded steel plate with aluminum finish. Basement (lower row of windows) contains the chief metallurgist's office, shower and toilets, steam engineers' quarters, and janitor's room. Steps leading up to the payroll windows (left) are divided by iron rails, separating the lines of approach**

MEETINGS

GALVANIZERS COMMITTEE TO CONVENE IN CHICAGO

■ THE GALVANIZERS committee will conduct its fifth meeting at the Palmer House, Chicago, Nov. 17-19. The program, arranged by a committee headed by N. E. Cook, Wheeling Steel Corp., Wheeling, W. Va., provides for two technical sessions on the first day, visits to the Gary sheet mill of Carnegie-Illinois Steel Corp. and Indiana Harbor galvanizing department of Inland Steel Co. on the second day, and a round-table and business session the third day.

Organized in 1936 under sponsorship of the American Zinc institute, the committee is composed of technical and operating men in the galvanizing departments of the steel industry, meeting twice a year to discuss problems of advancing the industry in tonnage and quality.

F. G. White, Granite City Steel Co., Granite City, Ill., is chairman of the committee, and E. V. Gent, 60 East Forty-second street, New York, is secretary.

NEW ENGLAND COUNCIL TO HOLD ANNUAL CONFERENCE

Fourteenth annual New England conference of the New England council will be conducted at Hotel Statler, Boston, Nov. 17-18. Embracing the states of Connecticut, Maine, Vermont, New Hampshire, Massachusetts and Rhode Island, the conference will consider economic problems common to these states. The program has not been announced. Howard C. Rice, 1032 Statler building, Boston, secretary.

On SIGN SUPPORTS HOT-DIP GALVANIZING IS NEEDED

Where rust climbs to inaccessible spots, where painting and inspection are difficult, where iron and steel are constantly exposed to wind and weather, and where failure due to rust may mean death to pedestrians . . . there Hot Dip Galvanizing demonstrates conclusively that it is the longest wearing, lowest cost protection known to modern science . . . Several state laws specifically read that all steel work on overhanging signs and billboards be galvanized . . . On structural supports, chains, bolts, nuts and strap fastenings, Hot Dip Galvanizing done by members of this association assures a thick layer of molten zinc which penetrates the surface and becomes an actual part of the product, giving a complete coverage of crevices and corners and guaranteeing perfect workmanship in every respect. Write for our literature. American Hot Dip Galvanizers Association Incorporated, American Bank Building, Pittsburgh, Pa.

IF IT CARRIES THIS SEAL IT'S A JOB WELL DONE

OFFICIAL INSIGNIA — PROTECTED BY GENUINE HOT-DIP GALVANIZING — AMERICAN HOT DIP GALVANIZERS ASSOCIATION INC.

Acme Galvanizing, Inc., Milwaukee, Wis.
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
American Tinning & Galvanizing Co., Erie, Pa.
Atlantic Stamping Co., Rochester, N. Y.
Buffalo Galvanizing & Tinning Wks., Inc., Buffalo, N.Y.
Columbian Steel Tank Company, Kansas City, Mo.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Enterprise Galvanizing Co., Philadelphia, Pa.
The Fanner Mfg. Company, Cleveland, Ohio
John Finn Metal Works, San Francisco, Cal.
Thomas Gregory Galvanizing Works, Maspeth, N. Y.
Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa.
The Hodell Chain Company, Cleveland, Ohio
Independent Galvanizing Co., Newark, N. J.
International Derrick & Equipment Co., Columbus, Ohio
Joslyn Co. of California, Los Angeles, Cal.
Joslyn Mfg. & Supply Co., Chicago, Ill.
L. O. Koven & Brother, Inc., Jersey City, N. J.
Lehigh Structural Steel Co., Allentown, Pa.
Missouri Rolling Mill Corp., St. Louis, Mo.
The National Telephone Supply Co., Cleveland, Ohio
Penn Galvanizing Co., Philadelphia, Pa.
Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.
San Francisco Galvanizing Works, San Francisco, Cal.
The Sanitary Tinning Co., Cleveland, Ohio
Standard Galvanizing Co., Chicago, Ill.
Wilcox, Crittenden & Co., Inc., Middletown, Conn.
The Witt Cornice Co., Cincinnati, Ohio

MIRRORS OF MOTORDOM

BY A. H. ALLEN
Detroit Editor, STEEL

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

DETROIT

■ ENCOURAGING bulge in steelmaking operations in the past three weeks is accounted for almost altogether by the feverish rush to place automotive steel before possible price readjustments, it now develops. October commitments by nearly all users were heavy and some bought as far ahead as February. This means that open hearths, especially those in the Cleveland-Detroit area, are going to be pushed in the next two months to fill this last-minute specifying by automobile companies.

A case in point is Buick which in October placed 36,000 tons of steel, largest monthly buy in many years, and far ahead of October purchases last year. And this tonnage was on top of 54,000 tons ordered through September for 1939 model production, bringing total buying to date to almost 90,000 tons.

Car production so far by Buick totals 38,000 and schedules for November and December will boost output to 93,000 by the end of the year. Assuming steel purchases will cover requirements until that time, it is seen that each new car calls for about one ton of finished steel.

Will Require 660,000 Tons of Steel

A little more pencil work reveals the last quarter will account for approximately 1,000,000 new cars and trucks, inferring need for 1,000,000 tons of finished steel. Assume one-third of this has been rolled; then in the next two months the auto industry will require 660,000 tons of steel which, figuring a yield of 70 per cent on ingots to finished steel —and this is high considering some continuous mill practice — would mean 943,000 tons of ingots. The latter figure represents 60 days' continuous output from about 60 open hearths of 150-ton capacity.

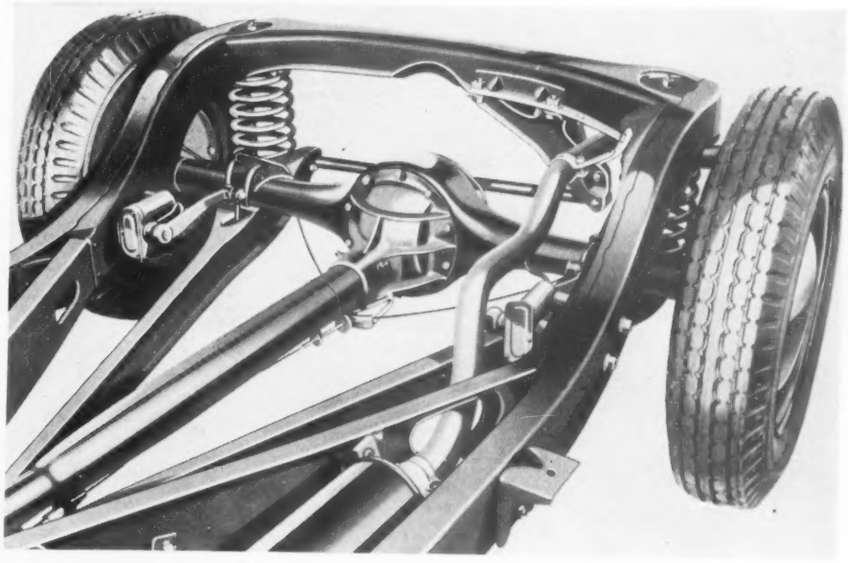
Twenty-one open hearths are pouring steadily here, four being idle. Thus, somewhere in the country's steelmaking capacity the uninterrupted production of 35 or 40 furnaces must be earmarked for steel shipments to the auto industry in the ensuing two months.

Conjecture is heard over how profitable this tonnage ultimately will prove to be. More than one producer refused to book any of this business and those in this category are consoling themselves now with the thought that original estimates of automobile steel needs are going to be short and further buying will have to be done. Ford, for one, will be in the market for more steel shortly, and probably will take figures on a month's tonnage the first of next week.

Ford announced last week the details of 1939 lines which went on display in dealers' showrooms Friday. Chief interest attached to the price on the new Mercury which has been set at $894 for the sedan model, with taxes adding another $50. Three other models range upward in price to $994, before taxes, all being Detroit delivered prices.

It is understood steel cylinder sleeves are being used in all the

New Type Frame To Prevent Sidesway



■ **A new idea in frame construction is apparent from this view of the rear section of the 1939 Buick, showing how the frame ends at the rear spring seats, requiring gas tank and bumper to be hung on body. Note also the sturdy radius bar and channel section strut rods to prevent sidesway and wobble of the rear axle**

Mercury engines, although the production setup as it finally will appear has not been completed. Now made largely by hand-operated equipment, these sleeves eventually will be produced at a rate of about 10-12 per minute on an interesting press set-up to be located in the new Ford press plant, now nearing its final stages.

The sleeves or liners are made of deep-drawing steel similar to fender stock and will be processed in presses with progressive-die arrangements such as now used in the forming of hubcap shells. With a special type of side feed, the first-stage press will include four drawing operations, with a push-up station between each draw, or seven stations in all. The liners then will pass through an annealing furnace and back to another press setup for three final drawing operations, flanging and cutoff.

After heat treatment and burnishing, the liners are inserted in blocks by placing them on mandrels actuated by screw feed which lower into the block and force the sleeve into place, a C-washer then being slipped over the end of the sleeve and the mandrel withdrawn. Observers report it takes only a minute or two to insert a liner into the block.

Ford Proposes New Plant

Henry Ford announced last week at Sudbury, Mass., that the company shortly would build a new plant there to produce "mining and agricultural equipment." Power will be received from a nearby dam, as is the case with a number of the Ford village industries.

This report at least partially confirms comment heard around Detroit this spring that the Ford company was contemplating a move into the field of farm equipment manufacture on a broad scale, although it must be remembered Mr. Ford's statements often anticipate actual activity on the part of the company by some time.

■ ACTIVITY in the stamping press field is quiet at the moment, with plants concentrating on getting out new model production. Press installations in recent months have been numerous, the new Ford press shop probably being the largest single job. Buick has installed new presses at Flint; De Soto has added several batteries at its stamping plant here; Briggs has put in a number of smaller types of presses at its new molding plant here; and Murray has purchased press equipment for instrument panels and body fittings.

Since 1939 models present a fairly large number of body changes, the press companies are not looking for many radical changes in body lines of 1940 models, the feeling being that body changes are made in two-year cycles, so the next big year for bodies will be 1941.

Ford's press shop probably will not be in operation until after the first of the year. It will be a model of efficiency, according to all advance reports. Presses will be of the latest designs, incorporating the smooth exteriors and streamlines which most press builders have developed in their new equipment.

A number of presses in the Hupmobile stamping plant here were bought by local shops in the disposal sale of this equipment. The building itself has been purchased by the Midland Steel Products Co., which operates a plant directly across the street.

Permission has been obtained from the city council to build a bridge across Mt. Elliott avenue, connecting the two buildings. At present, only about two-thirds of the equipment in the Hupp building has been disposed of, and Midland will not take possession until the plant is entirely vacated, which likely will be about Jan. 1. The additional space will be devoted to stamping work, and Midland plans to expand its activities in this field. The company is a prominent supplier of automotive frames, small stampings and specialties such as truck brakes.

Speaking of frames, two companies supply Pontiac requirements, one for the "quality" 6, and a second for the deluxe 6 and 8-cylinder models. It was anticipated about 60 per cent of Pontiac's production would be in the quality 6 field, but so far the deluxe 6 and 8 are accounting for about 60 per cent and the small job the balance. Pontiac assemblies up to Nov. 1 on new models totaled around 17,000, and schedules call for 20,000 in November and the same number in December. Last-quarter totals will be within 6000-8000 of the total for the same period last year, and represent an increase of around 17,000 over original estimates. Assemblies last week reached 4500.

Graham last week completed the third week of assemblies on its initial schedule of 1000 models in the 1939 series, and is now taking figures on another lot of 1500. Production is at the rate of about 250 per week, and this week should see the initial 1000 completed. Whether production can be started at once on the second lot will depend to some extent on whether suppliers can obtain steel.

Packard Figures on Small 6

Packard is taking figures on parts for a new small 6-cylinder model which may be in production shortly after the turn of the year. Prints on some dies are already out. Headlamps on the new model have been placed in the front fenders, suggesting that Packard may be developing entirely new lines for this job. Breaking from traditional Packard hood and radiator lines would be a radical move, but the success which other producers have had in departing from the conventional may spur Packard into doing likewise. There are some who feel Packard would be wise to stick to its traditional lines on the super-eight and 16-cylinder models and to develop entirely new lines for the 6 and 8.

Formal opening of the new Dodge truck plant on Mound road was celebrated here recently and marked culmination of the first step in a $6,000,000 commercial car and truck manufacturing and sales program. The plant, with total floor space of 693,163 square feet, will be devoted exclusively to body finishing and assembly of commercial vehicles ranging from ½-ton to 3-ton capacities, normal capacity being 700 units per day. Equipment includes 50 conveyors extending about 7 miles in total length, high-bake enamel system, rustproofing tunnels, hydrofilter spray booths.

Strife in the ranks of automobile labor has been at a minimum the last two weeks, although the UAW has announced it is about to undertake the establishment of standard wages and hours in automobile parts manufacturing plants.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519.022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96.936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	*250,000
10 mos.	3,691,517	4,292,459	1,893,035
Nov.	405.799	376,629	.....
Dec.	518,958	347,349	.....
Year	4,616,274	5,016,437	.....

*Estimated.

Estimated by *Ward's Reports.*

Week ended:	1938	1937†
Oct. 8	37,665	71,958
Oct. 15	50,540	89,680
Oct. 22	68 360	91,905
Oct. 29	73,335	90,155
Nov. 5	80,030	89,770

†Comparable week.

	Week Ended Nov. 5	Oct. 29
General Motors	38,825	34,350
Chrysler	18,250	16,750
Ford	12,875	12,875
All others	10,080	9,360

NO ORDINARY ENAMELING STOCK

• • • WOULD DO FOR THESE SIGNS!

Every sign in this fleet of bakery trucks is porcelain enamel—on Armco Enameling Iron. They'll look new and bright for a long time, and will be easy to keep clean.

These jobs had to be right. Jouncing about over broken pavements and rutty roads is a tough test for porcelain enamel. Both the purchaser and the enameler wanted to be sure of bond adherence and an enduring glossy surface. Hence their use of "Armco."

Porcelain enamel is an ideal finish for many consumer products and for much industrial equipment. And when you put it on Armco Enameling Iron, you insure salability and customer satisfaction as well as serviceability.

Armco Enameling Iron not only has every prime technical quality for fine, low-cost porcelain enameling, but it also has been nationally advertised to millions of people for 24 years.

If your product is good enough for porcelain enamel, then it's good enough for Armco Enameling Iron. We shall be glad to go into the matter with you. The American Rolling Mill Co., 1440 Curtis St., Middletown, Ohio. District Sales Offices located in all principal cities.

Armco ARMCO **Enameling Iron**

MEN OF INDUSTRY

■ CLARENCE B. RANDALL, vice president, Inland Steel Co., Chicago, and a leader in that city's community fund campaigns, was the principal speaker last Wednesday at a meeting which launched the drive for community funds in Cleveland. He formerly was associated with the Cleveland-Cliffs Iron Co. Cleveland-Cliffs officials, including W. G. Mather, chairman of the board; Alexander C. Brown, vice president; and Clifford S. Hood, president, American Steel & Wire Co., also took a prominent part in the meeting.

♦

C. S. Stilwell, vice president, Warner & Swasey Co., Cleveland, recently returned from a trip to Europe.

♦

W. O. Bates Jr., of San Francisco, has joined Caterpillar Tractor Co., Peoria, Ill., as manager of its patent department.

♦

Edward H. Lloyd has been appointed representative in the New England district for the Alan Wood Steel Co., Conshohocken, Pa.

♦

H. J. Mauderer, associated with Westinghouse Electric International Co., New York, for 18 years, has been elected treasurer. He succeeds C. V. Allen, retired.

♦

Frank Webster, formerly with Vitreous Enameling Co., Cleveland, has joined the Ferro Enamel Corp., Cleveland, as an enamel sales and service man.

♦

E. C. Ryan, 1036 Santa Cruz drive, Grand Rapids, Mich., has become associated with the Chicago Steel Service Co., Chicago, as district sales manager.

♦

Charles M. Mason, since April 1 assistant district sales manager, Buffalo district, Jones & Laughlin Steel Corp., has been appointed sales manager, succeeding Charles F. Gold.

♦

George P. Gardner Jr. has been elected a member of the board, General Electric Co., Schenectady, N. Y., succeeding his father, George P. Gardner Sr., who has retired after more than 40 years' service.

♦

Harry L. Frevert, president, Midvale Co., Nicetown, Philadelphia, has been elected a member of the board of directors, Baldwin Locomotive Works, and also of the executive committee, to fill vacancies caused

Clarence B. Randall

by the resignation of George H. Houston last month.

♦

Major General William H. Tschappat, former chief of ordnance, United States army, has been elected an honorary member, American Society of Mechanical Engineers, New York.

♦

Thomas Toby has become affiliated with the New York sales staff of Pittsburgh Screw & Bolt Corp., Pittsburgh. He previously had been a salesman for National Lock Washer Co., Newark, N. J.

♦

D. Robert Yarnall, chief engineer, Yarnall-Waring Co., Philadelphia, has been re-elected president, United Engineering Trustees, New York, of which the Engineering Foundation is the research organization. Other officers are: First vice president, Henry A. Lardner, J. G. White Engineering Corp., New York; second

D. Robert Yarnall

vice president, Albert Roberts, secretary, Minerals Separation North America Corp., New York; treasurer, H. R. Woodrow, vice president, Consolidated Edison Co., New York; assistant treasurer, J. P. H. Perry, vice president, Turner Construction Co., New York. John H. R. Arms continues as secretary.

♦

Edward G. Burgess, superintendent, Toronto, Ont., plant of Massey-Harris Co., manufacturer of tractors and implements, has been placed in charge of the company's plants in Racine, Wis., and Batavia, N. Y., as general superintendent.

♦

M. G. O'Harra, heretofore eastern sales manager, Norge division, Borg-Warner Corp., Detroit, has been promoted to vice president in charge of sales. He succeeds P. B. Zimmerman who has been advanced to vice president and assistant to the president.

♦

Dr. Robert B. Sosman, physical chemist, research laboratory, United States Steel Corp. of Delaware, Kearny, N. J., has been appointed a member, Bartol Research Foundation committee, Franklin Institute of the State of Pennsylvania, Philadelphia.

♦

Lou F. Kinderman, formerly with Republic Steel Corp. and Westinghouse Electric & Mfg. Co. in engineering work, has joined Iron & Steel Products Inc., Chicago, as Cleveland-Pittsburgh district sales representative. His headquarters will be in Warren, O.

♦

D. G. Henderson, vice president, Consolidated Steel Corp., Los Angeles, has been elected president. He succeeds Reese Taylor, who has become president, Union Oil Co. Alden G. Roach, associated with the company since its organization, has been named executive vice president.

♦

Charles O. McIntosh, West Hartford, Conn., has been re-elected president, southern New England chapter, Institute of Scrap Iron and Steel Inc. Sidney Albert, Albert Bros., Waterbury, Conn., has been re-elected vice president, and S. Samuel Kasden, H. Kasden & Sons Inc., New Haven, Conn., re-elected secretary-treasurer.

♦

William H. Boyle, formerly superintendent of blooming mills, Duquesne, Pa., works, Carnegie-Illinois Steel Corp., has been appointed superintendent of rolling, in charge of bloom, billet and bar mills. Other appointments at the Duquesne works are: Alex Montgomery Jr., formerly plant industrial engineer, as assistant to superintendent of rolling, in charge of bar mills;

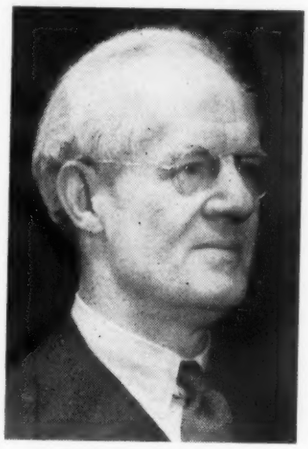
George L. Gallatin, heretofore superintendent of bar mills, as chief clerk, order and schedule; Joseph W. Kennedy Jr., formerly special engineer, as assistant to superintendent of rolling in charge of blooming mill; John W. Jordan, previously industrial engineer, as plant industrial engineer.

♦

John M. Collins, since 1933 treasurer and purchasing executive, Moore Drop Forging Co., Springfield, Mass., has been elected president. He succeeds the late Frank D. Fuller. Harold G. Dickey, vice president, has been named general manager, and Clarence J. Schoo, head of General Fibre Box Co., West Springfield, Mass., has been made a director of the Moore company.

♦

Charles Knupfer and Henry P. Kirchner have been appointed vice presidents, Carborundum Co., Niagara Falls, N. Y. Mr. Knupfer joined



Charles Knupfer

Carborundum in 1907 and was sent to Europe as special sales representative. He returned to this country in 1915, becoming district sales manager at Philadelphia. After the war he returned to Europe, and in 1936 was recalled to Niagara Falls where he took over the duties of general sales manager.

Mr. Kirchner joined the company in 1919 as maintenance engineer and in 1927 was appointed works manager.

Arthur Batts, secretary, and Mr. Knupfer have been elected directors.

♦

W. H. Rodgers has been appointed eastern engineering manager, Westinghouse Electric & Mfg. Co. He succeeds R. E. Powers, who has been appointed northwestern district service manager. After graduating from the University of Illinois in 1922, Mr. Rodgers entered the central station engineering section of Westinghouse and for nearly 15 years, until his present appoint-

W. H. Rodgers

ment, worked on electrical supply and distribution problems.

♦

H. C. Pearson, associated with American Steel & Wire Co., Cleveland, about 34 years, and since 1925 a salesman in the manufacturers department, has been appointed assistant manager of sales, New England district, with headquarters in Boston.

A. M. Marsh assumes the post of assistant manager, merchant products department, Chicago office. He has worked for the company as a salesman since 1934.

H. A. Hamilton will also continue as assistant manager, merchant products department.

♦

J. D. Waddell, president, Trumbull County Manufacturers association, Warren, O., since its organization in 1925, has been elected president emeritus. He has been succeeded as president by J. C. Manternach. W. A. Neracher has been elected vice president; Ralph Kroehle, re-elected treasurer, and Karl B. Dodge, secretary.

♦

Harry W. Symansky, Atlantic Steel Corp., Albany, N. Y., has been re-elected president, capital district chapter, Institute of Scrap Iron and Steel Inc. Charles Buff, Albany Scrap Iron Baling Co., Albany, has been chosen vice president. Sam Finkelstein, A. Finkelstein & Sons, Hudson, N. Y., has been re-elected secretary, and Sanford Levin, Estate of Morris Levin, Albany, has been re-elected treasurer.

DIED:

■ HARVEY E. EATON, of Teaneck, N. J., head of H. E. Eaton Co., New York, Oct. 25. He was long engaged in steel erection, and also organized the Eaton company to represent the Michigan Tool Corp. and its affiliated companies in this country and abroad.

♦

Abraham Lincoln Oertel, head of Oertel Co., New York, wire and steel merchant, in Brooklyn, N. Y., recently.

♦

Fred A. Garbett, 57, president, Twin City Machine Co., Minneapolis, manufacturer of roll grinders, feed mills, etc., in that city, recently.

♦

H. C. Rood, eastern sales manager, Northern Engineering Works, Detroit, at his home in Pelham Manor, N. Y., Oct. 27.

♦

Gustaf L. Schneider, 78, founder, Capital City Culvert Co., Madison, Wis., maker of corrugated steel highway specialties, Oct. 18.

♦

Otto A. Pegau, 53, former vice president and general manager, Briggs Mfg. Co., Detroit, in Detroit, Oct. 25.

♦

William Wesley Alexander, 64, until his retirement a year ago, vice president and general manager, John Deere Plow Co., St. Louis, in that city, recently.

♦

Mason B. Giberson Sr., one of the founders, National Foundry Sand Co., Detroit, and active in its management since its inception eight years ago, in that city, Oct. 24.

♦

Harry Lee Bridges, 52, purchasing agent, American Tool Works, Cincinnati, in Covington, Ky., Oct. 18. He was a member, Cincinnati Association of Purchasing Agents.

♦

James W. Mathews, formerly assistant superintendent, American Steel & Wire Co., Cleveland, in that city, Oct. 27. He had been an employe of the company 54 years, retiring in 1929.

♦

Albert William Remnitz, 72, retired engineer for the Llewellyn Iron Works, Los Angeles, in that city, Oct. 21. He was a member, American Society of Mechanical Engineers.

♦

Karl W. Nelson, 35, sales manager, plastics department, General Electric Co., Schenectady, N. Y., and formerly manager of the company's automotive products sales section, in Pittsfield, Mass., recently.

♦

David B. Carse, 74, retired consulting engineer, and from 1903 to 1907 a member of the advisory committee, United States Steel Corp., in West Cornwall, Conn., Oct. 30. He was a life member, American Society of Mechanical Engineers and American Society of Mining and Metallurgical Engineers.

Finished Steel Output Up 17.6%

■ FINISHED steel made for sale during third quarter totaled 5,287,995 gross tons, compared with 4,417,843 tons in second quarter, and 9,767,231 in third quarter, 1937, according to the American Iron and Steel institute. This was an increase of 17.6 per cent over second quarter.

During the period 509,103 tons was shipped to other plants in the industry for further conversion into finished products, leaving 4,778,887 tons for shipment to consumers, which is equal to 39.7 per cent of finishing capacity. In the third quarter last year net shipments were 8,782,015 tons, 74.1 per cent of capacity. Net shipments for three quarters this year were 12,845,174 tons, 35.6 per cent of finishing capacity, compared with 28,801,036 tons, 81 per cent, for nine months of 1937.

Effect of increased buying since midyear is apparent in most products. Structural shapes engaged 31.5 per cent of the capacity for such material, against 27.3 in second quarter; sheet piling increased from 43.3 to 56.3 per cent; steel bars from 22.8 to 28.6; sheets from 29.9 to 43.1; hot strip from 20.2 to 26.5; cold strip from 22.1 to 32.6 and plates from 20.7 to 25.6.

Tin plate declined from 42.5 per cent of capacity in second quarter to 29.7; black plate from 56.9 to 53.7, and standard rails from 19.1 to 12.2.

Shipments for further conversion in nine months this year totaled 1,191,977 tons; exports 1,057,549 tons.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

Third Quarter - 1938 (PERIOD)

		Number of companies	Items	Annual Capacity Gross tons	Production for Sale—Gross Tons: Current Quarter — Total	Current Quarter — Per cent of capacity	Current Quarter — Shipments: Export	Current Quarter — Shipments: To members of the industry for conversion into further finished products	To Date (9 Months 1938) — Total	To Date — Per Cent of capacity	To Date — Shipments: Export	To Date — Shipments: To members of the industry for conversion into further finished products
STEEL PRODUCTS	Ingots, blooms, billets, slabs, sheet bars, etc.	29	1	xxxxxxx	413,945	xxx	9,512	272,360	1,087,227	xxx	116,994	617,912
	Heavy structural shapes	8	2	4,657,100	366,575	31.5	15,164	-	992,657	28.4	55,306	xxxxxxx
	Steel piling	3	3	234,500	32,994	56.3	768	-	77,109	43.8	2,786	xxxxxxx
	Plates—Sheared and Universal	20	4	5,992,710	384,008	25.6	19,864	2,076	1,006,078	22.4	87,180	4,399
	Skelp	6	5	xxxxxxx	112,135	xxx	10,056	63,990	261,648	xxx	15,569	163,564
	Rails—Standard (over 60 lbs.)	4	6	3,395,000	103,965	12.2	1,392	-	465,453	18.3	15,975	xxxxxxx
	Light (60 lbs. and under)	6	7	436,500	8,756	8.0	863	-	27,698	8.5	4,536	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	105,000	3,521	13.4	1,099	-	13,465	17.1	4,593	xxxxxxx
	Splice bar and tie plates	14	9	1,310,050	45,796	14.0	599	-	167,578	17.1	2,422	xxxxxxx
	Bars—Merchant	37	10	xxxxxxx	433,890	xxx	14,299	43,193	1,139,141	xxx	72,543	128,814
	Concrete reinforcing—New billet	15	11	xxxxxxx	181,965	xxx	10,747	-	439,921	xxx	26,130	xxxxxxx
	Rerolling	20	12	xxxxxxx	33,522	xxx	2,340	-	92,012	xxx	6,397	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	69,582	xxx	1,115	-	170,791	xxx	4,754	xxxxxxx
	Alloy—Hot rolled	14	14	xxxxxxx	83,676	xxx	2,076	7,917	201,095	xxx	8,801	23,021
	Cold finished	14	15	xxxxxxx	8,286	xxx	84	-	19,460	xxx	517	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	15,906	xxx	385	-	40,359	xxx	1,149	xxxxxxx
	TOTAL BARS	55	17	11,547,859	826,827	28.6	31,046	51,110	2,102,779	24.3	120,291	151,835
	Tool steel bars (rolled and forged)	15	18	94,150	4,044	17.2	280	-	11,468	16.2	476	xxxxxxx
	Pipe and tube—B. W.	16	19	1,771,779	150,122	33.9	4,974	-	374,335	28.2	13,955	xxxxxxx
	L. W.	11	20	1,428,380	68,431	19.2	2,317	-	210,624	19.7	8,863	xxxxxxx
	Electric weld	4	21	614,000	41,468	27.0	1,545	-	102,251	22.2	8,571	xxxxxxx
	Seamless	15	22	2,942,900	279,202	37.9	12,682	-	787,941	35.7	58,430	xxxxxxx
	Conduit	8	23	163,270	10,903	26.7	513	-	30,611	25.0	1,211	xxxxxxx
	Mechanical Tubing	5	24	182,300	13,423	29.5	960	-	38,588	28.2	3,239	xxxxxxx
	Wire rods	19	25	xxxxxxx	109,967	xxx	2,090	41,774	260,647	xxx	19,489	96,651
	Wire—Drawn	38	26	1,961,370	218,869	44.6	12,610	1,889	548,519	37.3	35,022	6,444
	Nails and staples	19	27	1,078,572	118,653	44.0	6,972	-	310,016	38.3	18,125	xxxxxxx
	Barbed and twisted	16	28	425,477	33,441	31.4	10,825	-	99,584	31.2	23,012	xxxxxxx
	Woven wire fence	15	29	711,825	33,077	18.6	395	-	132,410	24.8	996	xxxxxxx
	Bale ties	11	30	110,677	13,168	47.6	74	-	31,435	37.9	254	xxxxxxx
	All other wire products	4	31	23,600	823	13.9	2	-	2,581	14.6	6	xxxxxxx
	Fence posts	14	32	147,100	9,120	24.8	341	-	32,637	29.6	825	xxxxxxx
	Black plate	12	33	503,015	67,546	53.7	1,731	25,925	201,845	53.5	5,606	67,612
	Tin plate—Hot rolled	11	34	1,631,956	121,150	29.7	13,371	-	484,952	39.6	119,777	xxxxxxx
	Cold reduced	10	35	1,828,100	210,226	46.0	21,325	-	585,690	42.7	50,019	xxxxxxx
	Sheets—Hot rolled	25	36	xxxxxxx	553,383	xxxx	22,446	22,770	1,247,165	xxxx	89,775	25,896
	Hot rolled annealed		37	xxxxxxx								
	Galvanized	16	38	xxxxxxx	259,625	xxx	18,410	-	616,961	xxx	58,788	xxxxxxx
	Cold rolled	19	39	xxxxxxx	254,812	xxx	18,450	-	673,878	xxx	61,671	xxxxxxx
	All other	15	40	xxxxxxx	63,095	xxx	2,451	-	162,066	xxx	9,218	xxxxxxx
	TOTAL SHEETS	26	41	10,504,353	1,130,915	43.1	61,757	22,770	2,700,070	34.3	219,452	25,896
	Strip—Hot rolled	25	42	3,223,200	213,775	26.5	6,890	27,214	550,464	22.8	25,859	57,664
	Cold rolled	37	43	1,178,961	96,070	32.6	2,821	-	222,986	25.2	7,285	xxxxxxx
	Wheels (car, rolled steel)	5	44	380,319	15,535	16.3	1,198	-	42,325	14.8	2,487	xxxxxxx
	Axles	5	45	425,900	12,599	11.8	1,380	-	29,715	9.3	7,237	xxxxxxx
	Track spikes	11	46	302,350	15,889	21.0	996	-	40,025	17.7	1,653	xxxxxxx
	All other	4	47	22,107	1,057	19.1	-	-	3,740	22.6	48	xxxxxxx
	TOTAL STEEL PRODUCTS	141	48	xxxxxxx	5,287,995	xxx	258,412	509,108	14,037,151	xxx	1,057,549	1,191,977
	Estimated total steel finishing capacity based on a yield from ingots of 70.6 %	-	49	48,152,500	xxxxxxx	39.7	xxxxx	xxxxxxx	xxxxxxx	35.6	xxxxxxx	xxxxxxx
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	29	50	xxxxxxx	685,914	xxx	139,434	109,114	2,158,614	xxx	329,570	264,084
	Ingot moulds	4	51	xxxxxxx	46,899	xxx	1,209	-	98,083	xxx	4,400	xxxxxxx
	Bars	12	52	230,519	3,929	6.8	294	30	11,196	6.5	311	82
	Pipe and tubes	4	53	185,457	6,538	14.1	49	-	19,076	13.7	374	xxxxxxx
	All other	2	54	63,560	1,427	9.0	164	668	5,316	11.2	306	1,944
	TOTAL IRON PRODUCTS (ITEMS 52 to 54)	14	55	421,576	11,894	11.3	507	698	35,588	11.3	991	2,026

Total Companies Included - 164

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current quarter 4,778,887 *G.T.;* 39.7 *% of Finishing Capacity.*
To date 12,845,174 *G.T.;* 35.6 *% of Finishing Capacity.*
The above tonnages represent 70.6 *% of the ingots produced by companies whose products are included above.*

Resumption of 17 Furnaces Pushes October Pig Iron Up 18.9 Per Cent

■ CONTINUING the upward swing initiated in July, blast furnace operations in October were given a substantial lift with resumption of 17 stacks, bringing the total to 114, highest in 11 months.

This was largest number of furnaces to return to operation in one month since April, 1936, when an equal number became active. This expansion in operating capacity resulted in October's production of coke pig iron increasing 18.9 per cent, with the daily rate at the highest point in nearly a year.

Daily average output amounted to 66,694 gross tons, 10,591 tons over the September rate of 56,103 tons. This was the highest daily output since November, 1937, with 66,901 tons. Production for October, a year ago, averaged 93,259 tons daily.

MONTHLY IRON PRODUCTION

Gross Tons

	1938	1937	1936
Jan.	1,444,862	3,219,741	2,029,304
Feb.	1,306,333	3,020,006	1,838,932
March	1,470,211	3,470,470	2,046,121
April	1,388,008	3,400,636	2,409,474
May	1,260,937	3,545,180	2,659,643
June	1,060,747	3,115,302	2,596,528
July	1,213,327	3,501,359	2,595,791
Aug.	1,495,514	3,616,954	2,711,726
Sept.	1,683,097	3,417,960	2,728,257
Oct.	2,067,499	2,891,026	2,991,794
Tot. 10 mo.	14,390,284	33,198,634	24,607,570
Nov.	.....	2,007,031	2,949,942
Dec.	.....	1,503,474	3,125,192
Total	.....	36,709,139	30,682,704

Total production in October was 2,067,499 gross tons, a gain of 384,402 tons, or 22.8 per cent compared with the September total of 1,683,097 tons. This was largest monthly output since October, 1937, when 2,891,026 tons was made.

Output in the first ten months this year was 14,390,284 tons, compared with 33,198,634 tons in the period last year, a decrease of 18,808,350 tons, or 56.7 per cent. Output in the like period of 1936 was 24,607,570 tons.

Relating production to capacity, operations in October averaged 48 per cent. This was the highest rate since November, 1937, when the figure was 49.3 per cent. Rate for September was 40.5 per cent; August, 34.8; July, 28.2; June, the low point, 25.2 per cent.

Of the 17 stacks added in October, four were merchant stacks and 13 steelworks furnaces.

Furnaces blowing in during October were: In Ohio: Canton and one Youngstown, Republic Steel Corp.; Ohio No. 1 and No. 4, Carnegie-Illinois Steel Corp.; Lorain No. 4, National Tube Co. In Pennsylvania: Edgar Thomson D and E, Carnegie-Illinois Steel Corp.; Eliza No. 4, Jones & Laughlin Steel Corp.; one Swede, Alan Wood Steel Co. In New York: One Buffalo, Republic Steel Corp.; one Buffalo, National Steel Corp.; Standish, Chateaugay Coal & Iron Co. In Alabama: One Pioneer, Republic Steel Corp.; Ensley No. 5, Tennessee Coal, Iron & Railroad Co. In Illinois: South Works Old No. 2 and E, Carnegie-Illinois Steel Corp. In Michigan: One Detroit, National Steel Corp.

AVERAGE DAILY PRODUCTION

Gross Tons

	1938	1937	1936	1935
Jan.	46,608	103,863	65,461	47,692
Feb.	46,655	107,857	63,411	57,675
March	47,426	111,951	66,004	57,120
April	46,267	113 354	80,316	55,719
May	40,675	114,360	85,795	55,986
June	35,358	103,843	86,551	51,949
July	39,131	112,947	83,735	49,043
Aug.	48,242	116,676	87,475	56,767
Sept.	56,103	113,932	90,942	59,009
Oct.	66,694	93,259	96,509	63,818
Nov.	.....	66,901	98,331	68,876
Dec.	.....	48,499	100,813	68,242
Ave.	47,336	100,573	83,832	57,694

New England Industry Increasing Efficiency

■ Increasing taxes, higher raw material costs and high wage rates are three major obstacles to reducing production costs, according to answers from nearly 500 industrial firms in a survey conducted jointly by the New England Council and Engineering Societies of New England Inc. Other factors reported were obsolete machinery and high material handling costs.

Most firms indicated intention to continue modernization and to spend most of their depreciation reserves for plant and machinery. Inefficient equipment is being replaced to increase output per man-hour, and products are being redesigned to reduce material costs rather than to substitute less expensive materials.

One machine tool manufacturer has plans for a $1,400,000 modernization program, and a new plant to cost $400 000. Metalworking companies reported modern equipment installations had resulted in lower costs, increased production and higher quality. Among methods to reduce handling expense are rearrangement for straightline movement, establishment of careful machine inspection, and higher efficiency by repair crews.

OCTOBER IRON PRODUCTION

	No. in blast last day of Oct.	No. in blast last day of Sept.	Total tonnage Merchant	Total tonnage Nonmerchant
Ohio	28	23	63,994	421,315
Penna.	29	25	*42,864	*479,480
Alabama	15	13	118,558	114,467
Illinois	9	7	46,397	136,870
New York	9	6	40,967	*132,817
Colorado	1	1		
Indiana	8	8	*8,323	310,908
Maryland	4	4		
Virginia	1	1		
Kentucky	1	1		
Mass.	0	0		
Tenn	0	0		
Utah	1	1	5,985	144,554
West Va.	3	3		
Michigan	4	3		
Minnesota	1	1		
Missouri	0	0		
Total	114	97	*327,088	*1,740,411

*Includes ferro and spiegeleisen.

RATE OF OPERATION

(Relation of Production to Capacity)

	1938[1]	1937[2]	1936[3]	1935[4]
Jan.	33.6	76.6	48.2	34.2
Feb.	33.6	79.5	46.4	41.4
March	34.2	82.5	48.5	41.0
April	33.4	83.7	59.1	40.0
May	29.4	84.3	63.1	40.2
June	25.5	76.6	63.6	37.2
July	28.2	82.9	61.5	35.2
Aug.	34.8	85.7	64.3	40.7
Sept.	40.5	83.7	66.9	42.5
Oct.	48.0	68.4	71.0	45.8
Nov.	....	49.3	72.3	49.5
Dec.	....	35.6	74.2	49.0

[1] Based on capacity of 50,606,400 gross tons, Dec. 31, 1937; [2] first half on capacity of 49,512,737 tons, Dec. 31, 1936—second half on capacity of 49 727,737 tons, June 30, 1937; [3] capacity of 49,777,893 tons, Dec. 31, 1935; [4] capacity of 50,845,741 tons, Dec. 31, 1934. Capacities by American Iron and Steel Institute.

New British Tin Plate Plant Starts Production

■ Production has been started at the new Ebbw Vale plant of Richard Thomas & Co., Monmouthshire, Eng. A feature is a continuous strip mill, duplicating Ford Motor Co.'s mill at Detroit. (Steel, July 11, p. 17.)

At full operation 6000 workers will be employed. Output of the mills will be used in production of tin plate, the company being an important factor in that industry.

H. A. Brassert & Co., Chicago, rebuilt the blast furnaces and erected coke ovens and steel plant. United Engineering & Foundry Co., Pittsburgh, and Davy United Co. of England built the continous mill. A number of metallurgists and mill operating men from steel companies in the United States have been placed in important operating positions.

EDITORIAL

Between the Millstones

■ FINANCIAL statements covering the steel industry's operations during the third quarter of 1938 supply food for considerable thought. It cost 14 steel producers, representing 83.7 per cent of the country's ingot capacity, $7,282,424 to run their business during that period as the government wants—with steel selling prices lower but with high prevailing unit wage rates untouched.

Outlook for fourth quarter earnings is better, due to increased volume of business One leading producer says that its present "break-even" level is 45 to 50 per cent of ingot capacity. For the industry in general the average break-even point between profitable and unprofitable operations appears to be somewhat higher. With current output around 55 per cent of ingot capacity, and with indications that demand should be sufficient to support a good operating rate over the rest of the year, the steel industry may report a slight profit during the fourth quarter.

Price Reductions Without Wage Cuts Have Pleased Nobody

Thus management in the steel industry is faced by a real problem which results from its failure to adhere to an axiomatic principle—namely, that steel prices and steel wages are inseparably linked. The third quarter showing and the failure to adhere to the principle of this inseparable link between prices and wages resulted from the peculiar atmosphere in which business management now is forced to function. Prices were lowered for two reasons: The administration wanted lower prices and keen competition in the industry forced them. Wage rates were maintained because the administration went on record on every opportune occasion to say they must be maintained.

The peculiar thing about the steel industry's accomplishment of reducing prices without touching wage rates is that it has pleased nobody. Newspapers have run prominent headlines about steel price wars. Newspaper editorials and the comments of economists have been coldly critical of the policies of the steel industry.

Labor leaders have obtained feature space for claims that the steel industry did not know how to run itself and should be run by the government. Impetus for more government control of the steel industry gathered among politicians. Customers have been puzzled by the price situation. Nowhere has there been any note of sympathy for harassed leaders in the steel industry.

The entire situation appears to have played right into the hands of the national economic committee in its anti-monopoly studies, with indications that the management of the steel industry will be a subject for major research. And maybe that will be a good thing.

If Costs Are Controlled Selling Prices also Must Be Fixed

How the steel industry will find its way out of the present dilemma is a perplexing problem. Wage rates can be reduced—but that would stir up an unpleasant situation in which the steel industry would be further dramatized in the public eye as a malefactor of the first order. Prices can be advanced for the first quarter of next year on a scale commensurate to producing costs—but there again no safety could be assured because of the competitive situation.

Steel's problem results either from too much government and politics in business, or too little. No believer in the principle of private initiative can work up much enthusiasm for some of the controls under which business must now function. One thing, however, is increasingly clear. That is, no permanent compromise between a system of controls and a system of free enterprise is possible. Control of labor, wage rates, taxes, freight rates and other cost factors is not enough. Under a system of controls, control of selling prices is an essential.

THE BUSINESS TREND

Activity Index Nears Comparative 1937 Level

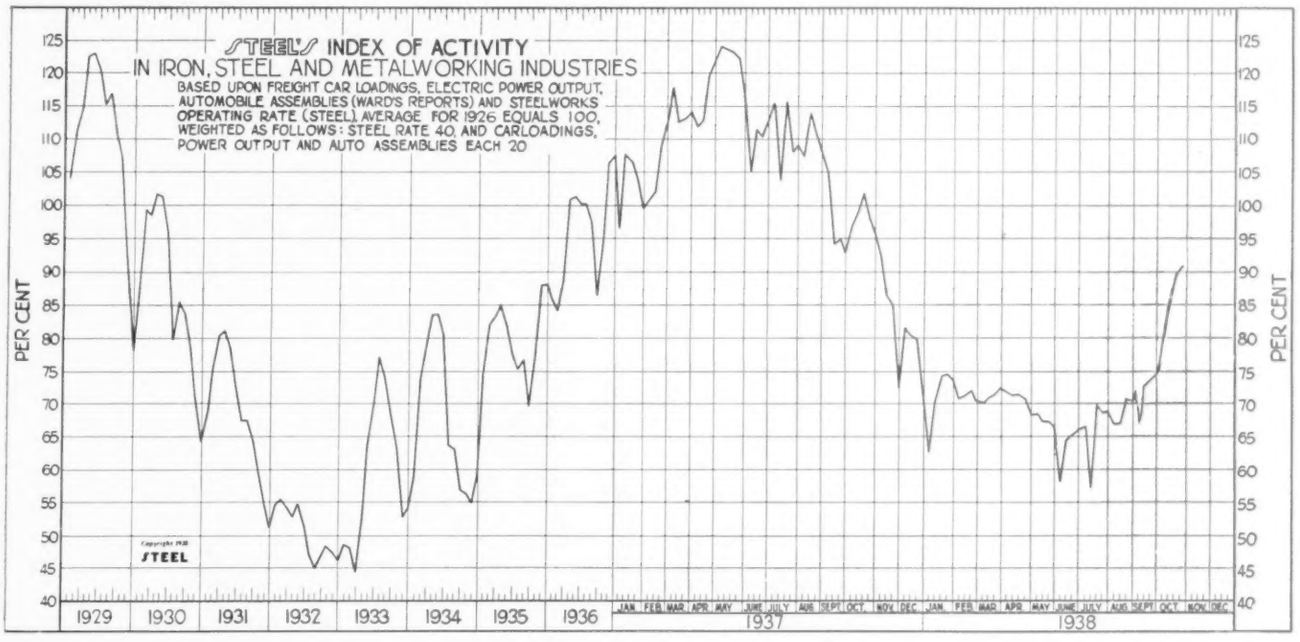
■ INDUSTRY'S progress toward recovery continues at an encouraging pace. For the seventh consecutive weekly period since Labor day week STEEL'S index of activity in the iron, steel and metalworking industries showed a moderate gain. The latest advance during the week ended Oct. 29 forced the index into new high levels for any week since Nov. 6, 1937. It now stands at 91.5 per cent compared with 88.7 in the preceding week and 95.7 in the identical week last year.

Contributing to the advance in the activity index for the week ended Oct. 29 were moderate increases in all four barometers from which the index is derived. The most encouraging of these was a gain of 3 points in the rate of steelmaking operations, after remaining unchanged at 51.5 per cent in the preceding week. Excluding holiday weeks the national steel rate has registered only one decline since the week ended May 7. Still further improvement in this important indicator is scheduled for the week ended Nov. 5.

Automobile assemblies increased approximately 5000 cars to 73,335 in the week ended Oct. 29. This represents the sixth consecutive weekly advance and constitutes the best operating schedule since Dec. 18, 1937. The outlook for this industry over the next 60 days offers considerable encouragement. Indications now are that assembly lines will continue to step-up production schedules through the next four to six weeks. Earlier estimates of the total production on 1939 models have in most instances been revised substantially upward within the past month.

Early estimates of revenue freight carloadings during the week ended Oct. 29 indicate that carloadings regained a portion of the loss incurred in the preceding week. Electric power consumption of 2,226,038,000 kilowatt-hours in the week ended Oct. 29 not only represents a substantial increase over the preceding week but also constitutes the first time this year that power output has exceeded the comparable week in 1937.

While temporary interruptions in the recovery movement among certain industrial groups are to be ex-


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40
STEEL
1929 1930 1931 1932 1933 1934 1935 1936
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1937
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938

STEEL'S index of activity gained 2.8 points to 91.5 per cent in the week ended Oct. 29:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
July 23	68.7	108.0	102.1	80.8	68.1	79.4	51.5	69.7	78.7	120.8
July 30	69.0	109.1	102.5	78.4	66.4	78.8	46.1	68.9	79.2	117..
Aug. 6	66.9	107.3	98.7	73.4	64.6	75.9	45.1	67.0	85.6	117.2
Aug. 13	66.9	113.8	92.6	77.5	64.6	74.7	44.6	67.4	86.2	116.8
Aug. 20	70.5	110.3	97.7	77.0	61.4	74.2	44.9	67.3	88.5	116.4
Aug. 27	70.3	108.5	94.0	77.3	60.3	71.6	45.2	66.5	87.4	116.9
Sept. 3	72.3	104.8	87.5	70.9	55.1	70.3	45.4	65.3	79.0	106.3
Sept. 10	66.8	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0
Sept. 17	72.9	95.0	90.1	69.4	58.7	69.1	47.8	65.6	86.2	112.2
Sept. 24	74.0	93.0	86.2	68.5	58.1	68.2	48.0	65.2	83.8	110.7
Oct. 1	74.9	96.6	89.0	73.3	59.3	66.9	47.7	62.4	81.0	109.1
Oct. 8	78.9	99.0	93.4	74.9	54.7	67.4	48.4	61.5	79.4	108.2
Oct. 15	84.3	101.8	95.5	77.4	56.4	66.0	48.7	57.9	77.5	106.1
Oct. 22	88.7†	97.5	97.1	82.4	58.2	60.9	48.7	58.2	77.4	104.8
Oct. 29	91.5*	95.7	99.1	86.4	56.3	58.0	48.3	55.9	72.5	102.5

* Preliminary. † Revised.

pected, it is becoming increasingly clear that an expansion of encouraging potentialities is under way. However, the conduct of labor and the farm income prospects are two important factors which may temper the rate of expansion.

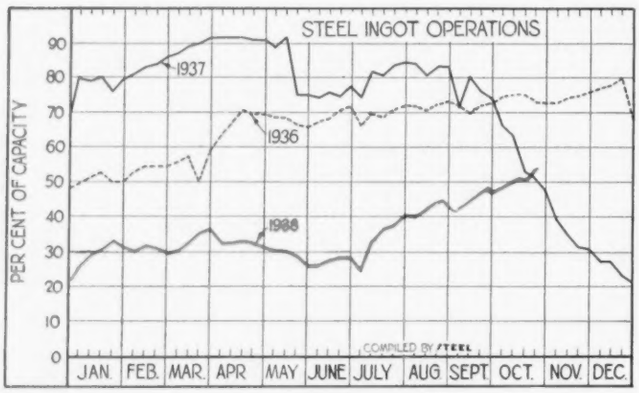
EXPORT BALANCE OF TRADE INCREASES

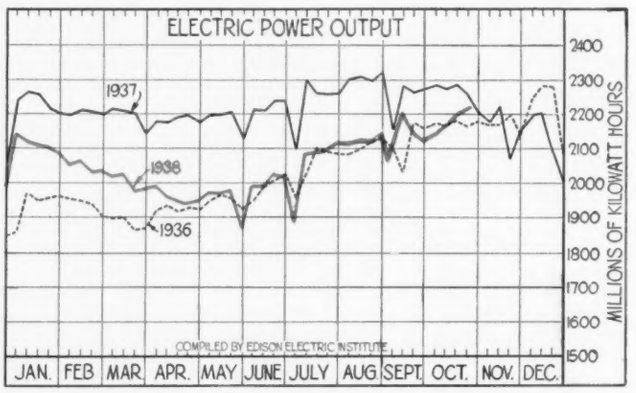
Encouraging gains in industrial activity during September are further reflected in the export statistics for the month. September exports totaled $246,361,000 and imports $167,651,000, leaving an export balance of $78,710,000. In August exports of $230,625,000 and imports of $165.541,000 left an export excess of $65,034,000, while in September, 1937, there was an export balance of $63,437,000. For the nine months ended Sept. 30 an export balance of $360,234,000 resulted from exports of $2,295,196,000 and imports of $1,434,962,000. In the same period last year exports of $2,378,357,000 were exceeded by imports of $2,427,446,000, leaving a balance on the import side of $49,089,000. This reversal from an import balance to an export excess within the past year has been caused by the diminution of imports rather than by any gain in exports, which in fact were smaller.

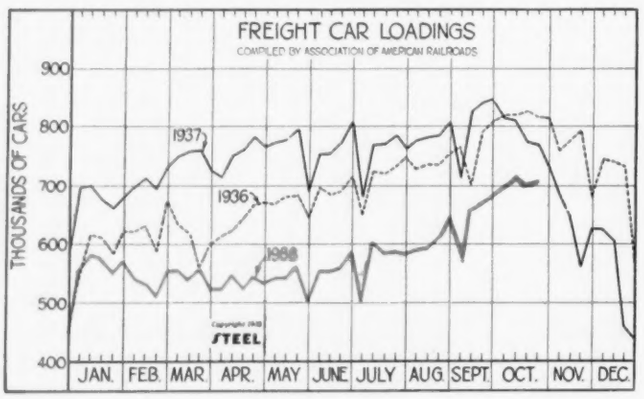
Following the general trend steel and iron exports and imports during September also made encouraging gains. Exports for the month of 346,068 gross tons valued at $13,270,362 represent a substantial increase over the 242,139 tons valued at $10,289,470 during August. A year ago exports totaled 543,740 tons with a valuation of $24,061,036. Imports in September totaled 27,958 gross tons compared with 20,041 tons during August, but remained below the 37,071 tons reported in September last year.

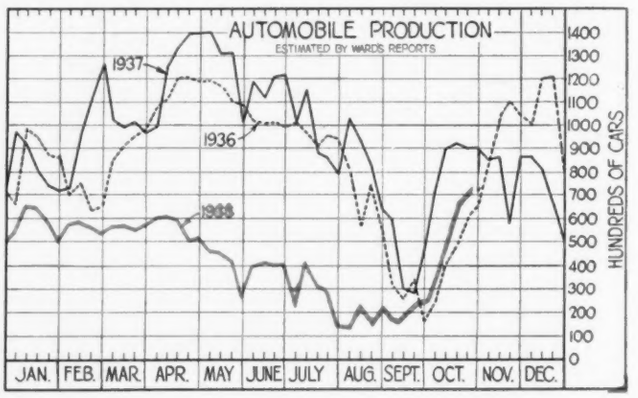
AUTOMOBILE ASSEMBLIES LOWER IN SEPTEMBER

Production of automobiles including passenger cars and trucks in the United States and Canada, totaled only 89,623 cars during September, according to the United States department of commerce recent report. Assemblies during September marked the low point of this year's automobile production, representing a moderate decline from the previous low of 96,936 cars assembled in August. In September a year ago automobile production was placed at 175,630 units. For the first nine months this year motor car assemblies were less than half the output of the corresponding period last year, the 1938 figure of 1,643,035 comparing with 3,954,480 during the first nine months of 1937.



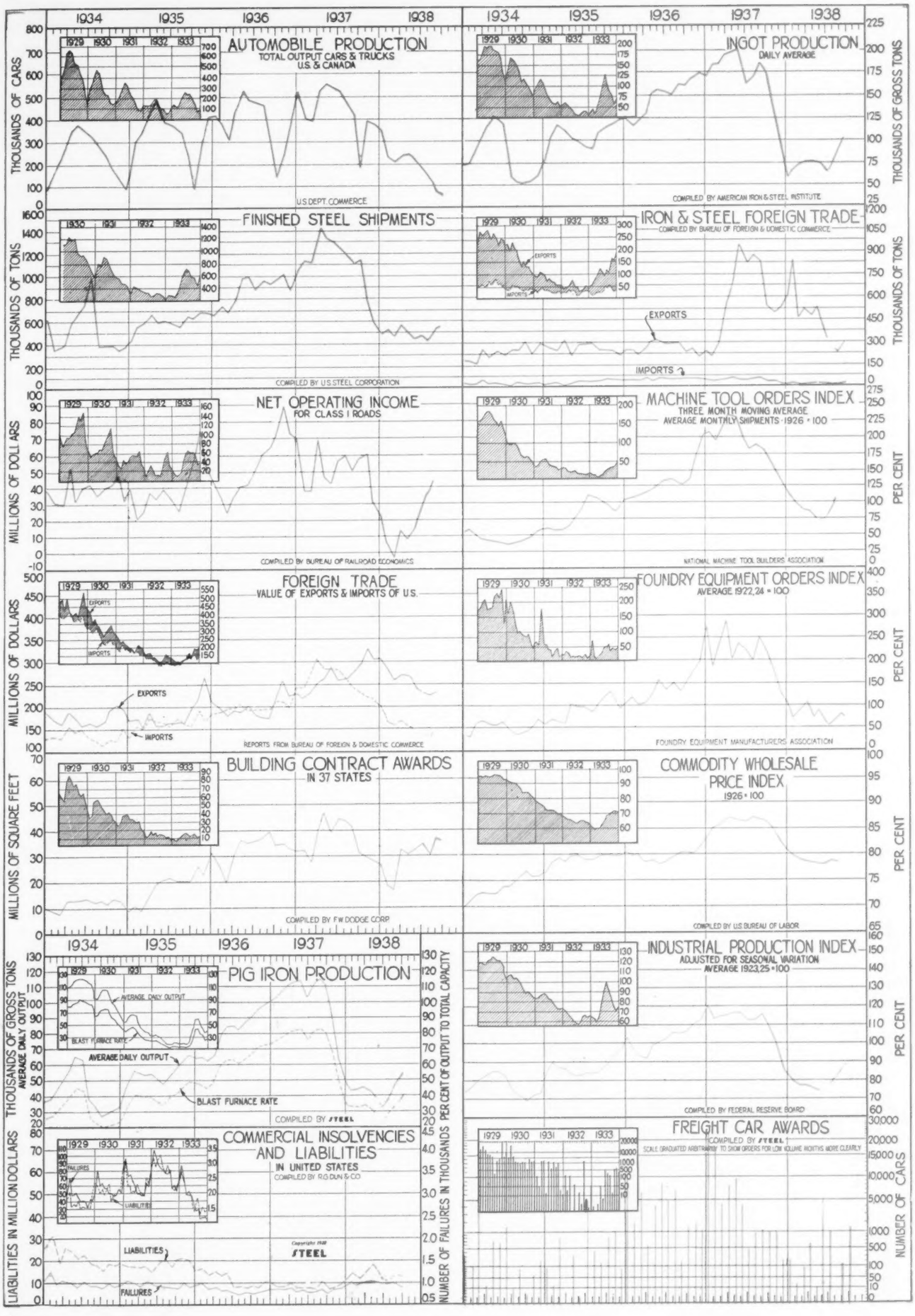






Week ending	Steelworks Operating Rate Per Cent 1938	1937	1936	Electric Power Output Million KWH 1938	1937	1936	Freight Car Loadings 1938	1937	1936	Weekly Auto Output 1938	1937	1936
July 23	36.0	81.0	70.5	2,084	2,258	2,088	580,882	770,980	731,062	32,070	88,055	96,863
July 30	37.0	84.0	71.5	2,093	2,256	2,079	588,703	782,660	747,551	30,390	86,448	95,970
Aug. 6	40.0	84.5	71.5	2,115	2,261	2,079	584,050	769,706	728,293	14,771	78,736	81,804
Aug. 13	40.0	84.0	70.5	2,133	2,300	2,093	589,561	777,382	736,497	13,790	103,250	56,679
Aug. 20	41.5	81 0	72.0	2,138	2,304	2,125	597,918	781.247	734,973	23,940	93,339	73,709
Aug. 27	43.5	83.0	73.0	2,134	2,294	2,135	620,511	787.373	753,742	18,700	83.310	53,937
Sept. 3	44.5	83.0	71.5	2,148	2,320	2,098	648,039	804,633	764,680	22,165	64,200	31,628
Sept. 10	41.5	72.0	69.5	2,048	2,154	2,028	568,887	711,299	699,859	17,485	59,017	26,750
Sept. 17	46.0	80.0	72.5	2,214	2,280	2,170	660,142	826,365	789,510	16,100	30,150	33,165
Sept. 24	48.0	76.0	73.0	2,154	2,265	2,157	675,353	840.446	807,070	20,390	28,030	15,680
Oct. 1	47.0	74.0	74.5	2,139	2.275	2,169	697,938	847,245	819,126	25,405	45,830	22,800
Oct. 8	48.5	66.0	75.0	2,154	2,280	2,168	702,964	815,122	820,195	37,665	71,958	39,945
Oct. 15	51.5	63.0	75.0	2,182	2,276	2,170	726,612	809,944	826,155	50,540	89,680	48.195
Oct. 22	51.5	53.0	73.0	2,214	2.281	2,166	705,628†	773,353	815,972	68,360	91,905	59,740
Oct. 29	54.5	51.0	73.0	2,226	2,254	2,175	712,339*	771,655	814,175	73,335	90,155	66,985

*Preliminary. †Revised.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
Copyright 1938 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
MILLIONS OF SQUARE FEET
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
LIABILITIES IN MILLION DOLLARS
THOUSANDS OF GROSS TONS
PER CENT
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
NUMBER OF CARS

Wire Coiling Machines

Utilize modern manufacturing methods and heat-treating procedure to make unique fabricating machines for high production of complicated springs and similar shapes

By J. B. NEALEY

■ THE FIRST fully automatic wire-forming machine was invented in 1879 by F. H. Sleeper when he was only 17 years old. Thirty-two years later he invented the first completely automatic coiling machine, revolutionizing this industry by eliminating manual cutting-off and end-squaring operations. The most recent design is a selective gear type universal machine that will coil any form, shape and size spring with wire up to ⅜-inch in diameter, at speeds varying from 25 to 135 feet per minute.

In 1911 Sleeper & Hartley Inc., Worcester, Mass., built a factory to make these machines. Since then they have brought out other automatic machines, such as tube coilers, BX-cable machines, cable-armoring machines, lock-washer machines and many special purpose machines for handling wire and strip. Fig. 1 shows typical parts made.

One of these machines recently was designed to make the ring gear of a popular-priced car. Of hot-rolled steel stock ⅞-inch wide and ⅜-inch thick, a perfect ring 12 inches in diameter is formed and cut off cold from 400-pound coils at the rate of 20 per minute by this unit. Formerly this was a hand operation including winding on the arbor of a lathe and cutting off in a milling machine.

Automatic machines for making BX cable and for armoring cable up to 3 inches in diameter also are made here. One of these is built to armor cable 1⅛ inches in diameter in 3500-foot lengths, a ton of steel strip going into each length.

A BX-cable machine consists of a large steel spool surrounding the coiling tools and upon which the steel strip is first wound. Strip is fed from here into the first of two sets of rolls which form the strip and turn in the edges for a lock joint. Second set of rolls coils strip around the cable, fed straight through the center, and locks the joint continuously and automatically. These machines operate at 625 revolutions per minute and turn out BX cable at a rate of 13½ feet per minute.

Use Special Milling Units

Equipment in this plant consists of a large variety of latest machine tools. In addition there are special milling machines of large capacity designed and built here. Fig. 3 shows a group of these. One will accommodate a piece of steel 16 feet long, 6 feet wide and 4 feet high. It finishes castings in a third of the time taken by a planer. More than 100 men are employed in this plant practically all of whom are tool makers and expert mechanics.

Approximately 500 parts of these

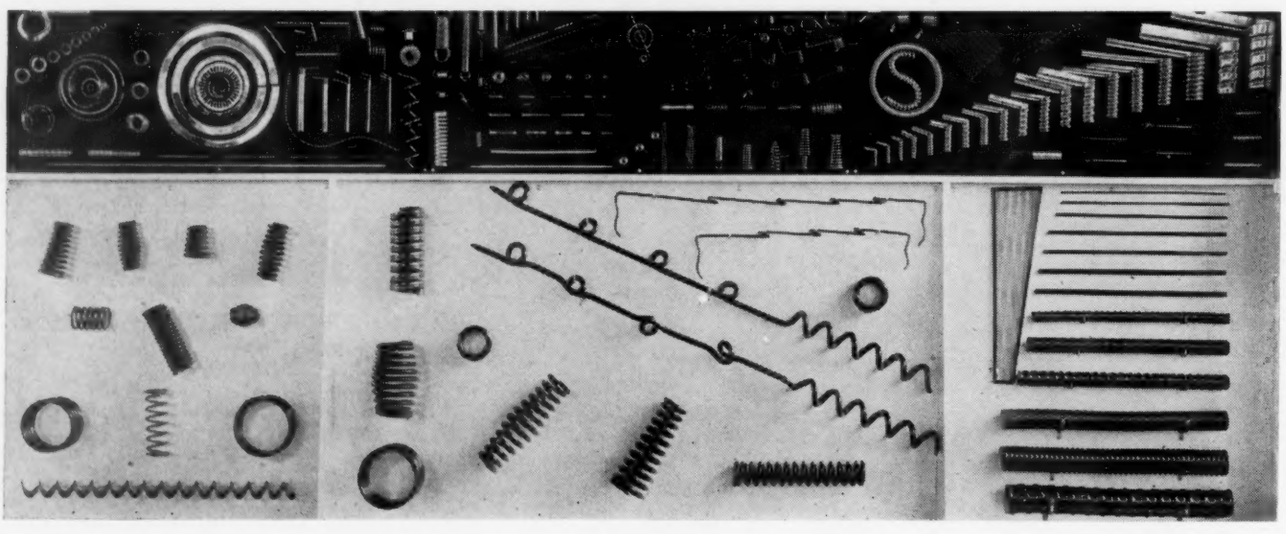


Fig. 1—This shows the many special shapes and fabrications which can be made by modern wire coiling machines such as those described here

Fig. 2—Part of heat-treating department at plant of Sleeper & Hartley Inc., Worcester, Mass.

machines must be heat treated. These include gears, cams, arbors, ratchets, guides, rollers, etc. For this work a most efficient and adequate heat treating division has been set up. For carburizing there is an oven-type furnace 2 x 4 x 1 foot high, inside underfired with 10 gas burners divided between the two sides and staggered so alternate streams of hot gases pass each other to flow up and across the heating chamber above the hearth. Complete circulation of heat around packed boxes of work is effected. Temperatures up to 1800 degrees Fahr. are used.

Gas is used for fuel in all the furnaces. With one exception, burners are manifolded to a zero gas governor and automatic proportioning gas-air valve and inspirator. A single, positive-pressure air blower furnishes air at one pound for burners of all furnaces.

Steel Encloses Refractory

Carbon steel gears, cams, etc. are heated in another oven-type furnace, unique in that it contains no firebrick except those that compose the hearth. Walls, top and bottom employ 9 inches of insulating refractory enclosed by a steel case. Heating chamber is 18 x 30 x 10 inches high and hearth is under-fired by a double set of gas burners for high and low temperatures. Two burner nozzles of different capacities, one concentric within the other, are in a single casting. Burners have two sets of manifolds, zero governors, inspirators, etc.

Air line to larger set of burners has a motor valve with high and low setting, by-pass and connection to an indicating pyrometer controller. Monometers for manifold pressure indication are included. Temperatures between 1000 and 2000 degrees Fahr. are used in this furnace. It will easily heat eight 6-inch rolls.

Salt Bath Employed

For drawing and tempering, a salt bath is employed with a ring-type atmospheric gas burner below the pot. This is good for work requiring temperatures ranging between 300 and 800 degrees Fahr. Hardening of parts requiring a hard wearing surface and comparatively soft core is accomplished in one of two cyanide pots about 8 inches in diameter and 16 inches deep. These pots sit in furnaces which contain no firebrick. The walls consist of 9 inches of insulating refractory within a steel shell. Heat is supplied by four tunnel-type gas burners equally spaced on the furnace wall, both circumferentially and vertically. These fire tangentially to inside of furnace wall. Flame does not impinge on pot. This freedom from flame contact greatly increases pot life.

Excessive Heat Prevented

Zero governors, inspirators, etc. are part of the combustion equipment as well as a solenoid valve operated by a visual pyrometer controller. A feature of the temperature control system of these pots is the use of the double thermocouples, one in the bath and one in the furnace. Purpose is to prevent excessive heat in combustion chamber, thus prolonging pot life.

Three kinds of quenches are employed: Water, brine and oil. These are contained in steel tanks. Pressure air is employed in the brine tank for agitation to keep the salt crystals from settling on the bottom.

Refractory-insulating linings of the type mentioned are being used in furnaces more and more every day. They are especially useful for furnaces that are employed intermittently or where rapid heating or quick changes in temperatures are required. While these linings are burned at the same temperature as first quality fire brick, they are lighter in weight and have a lower heat conductivity. Due to lower heat absorption it takes less gas to heat a furnace lined with refractory insulation. Due to lower radiation losses it requires less gas to hold a furnace at temperature than if the same furnace were lined with standard firebrick of the same thickness.

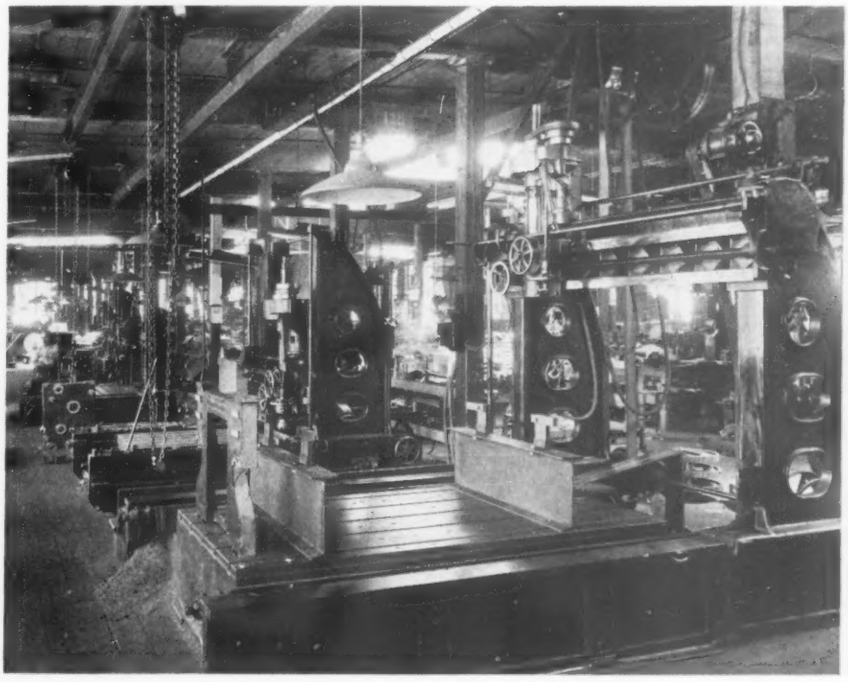
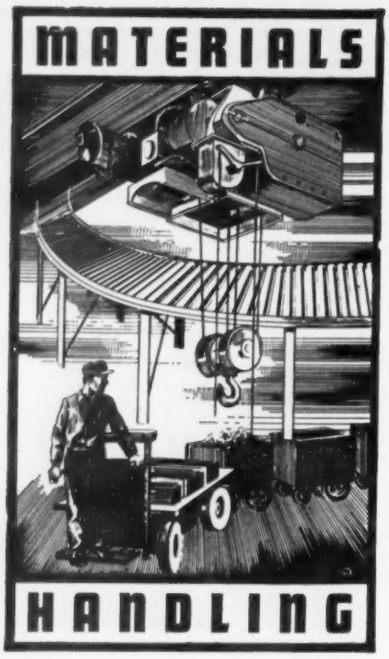


Fig. 3—Several of the special milling machines which finish large castings in one third the time required by a planer



Assembly Serving

Synchronizing rate of shipment of incoming material with rate of consumption on assembly line eliminates need for storage areas and results in significant economies

■ WHILE modern automobile assembly lines have become symbolic of the efficient, large-scale methods of manufacture that today give the consumer more for his dollar than ever before, operation of these lines depends entirely upon a fast, never-failing system of feeding materials and parts to the line.

At the Oshawa, Ont., plant of General Motors of Canada, a fleet of industrial trucks, powered by storage batteries, is employed to serve the assembly lines and auxiliary manufacturing operations. Here the rate of incoming material is scientifically synchronized with rate of use in a system with an exceptionally small amount of lost motion. In this plant, Chevrolet, Pontiac, Oldsmobile, Buick, LaSalle and Cadillac cars are assembled for shipment throughout the Dominion of Canada. As each of these may involve several models, it is easily seen that a tremendous number of parts are required for the assembly operations here.

With 4200 men employed, it is essential that movement of material be well organized. Work handled by the industrial trucks may be divided into three main classifications:

Transporting manufactured parts which arrive from other General Motors plants by rail. These are carried directly to the proper location on the assembly line where they are built into the automobiles. See Fig. 1.

Following progress of parts manufactured in the Oshawa plant and transporting them through successive steps to final place on the assembly line.

Distributing small or miscellaneous parts to the receiving room upon their arrival by rail and later delivering them to the assembly line as wanted.

While these classifications are not definitely separated functions, they help to visualize the complicated materials handling system necessary to maintain a satisfactory production rate in this plant.

Entirely apart from the fact that they facilitate and increase the working speed of the entire plant, these power trucks are credited by General Motors officials with having almost completely eliminated that bugbear of mass production—stops at storage. In other words, distribution and placing of incoming parts is accomplished almost immediately upon arrival. The rate of supply is synchronized with rate of use so it becomes unnecessary to provide storage space and to concede the loss of time and labor which results when arriving parts are stored prior to

Fig. 1—Heavily loaded truck and trailer negotiate ramps easily

Fig. 2—Body parts emerging from enameling oven are placed in tote boxes which the waiting truck will move quickly to point of use on the assembly line

being delivered to the point of use.

Before the advent of industrial trucks, this equalizing of receipt of materials and parts to coincide with their rate of absorption into the finished product was one of the most pressing and apparently hopeless problems that was encountered.

Of course, considerable attention must be given to rate of production on the assembly line and such study must be maintained constantly to assure proper quota of parts being ordered and supplied without either building up a surplus or experiencing a shortage. At the Oshawa plant, these details are the subject of a careful survey carried out continually. Whether the item is an engine frame, a small bolt or a delicate thread of wire, the requirements in that item for each day are established in advance. In only a very few of the hundreds of parts used here is a surplus permitted to accumulate. These are usually those very small parts where storage is no problem due to the little space required.

Such a scheme of course operates to cut the number of power handlings greatly, thus introducing significant economies in handling costs as well as reducing or eliminating storage areas formerly necessary. Eliminating the stop at storage just halves the number of setdowns and pickups needed between incoming point and delivery point on the assembly line.

Shortens Length of Haul

As it usually is not feasible to have storage areas exactly on the way to the assembly line from point of receipt at the plant, eliminating use of storage areas shortens the length of haul, introducing additional economies.

Since cars pass down the assembly line at a rate previously determined, the object of the system is to have the required supply of materials fed to the line so the available space immediately adjoining the line is sufficient to store all the parts required to keep the entire operation equalized.

Receipt of frames, engines, pans, fenders, and other large parts is carefully timed and so regulated that practically the only stock of parts maintained are those small items made in other plants and shipped in. Due to their small size, storage of these is no problem but because of their great variety, close following through of incoming shipments becomes more difficult and costly than is justified.

Even in this storage of small parts, however, handling operations have been cut to the very minimum. All these small parts are carried in one stockroom, they go nowhere else prior to placing directly on the assembly line.

Where further processing is required, parts are placed in tote boxes with sectionalized sides, as illustrated in Figs. 2 and 4. This type of tote box permits making up large loads for efficient handling, yet by removing side sections one at a time they avoid lost motion by the operator who unloads them into the assembly or processing line.

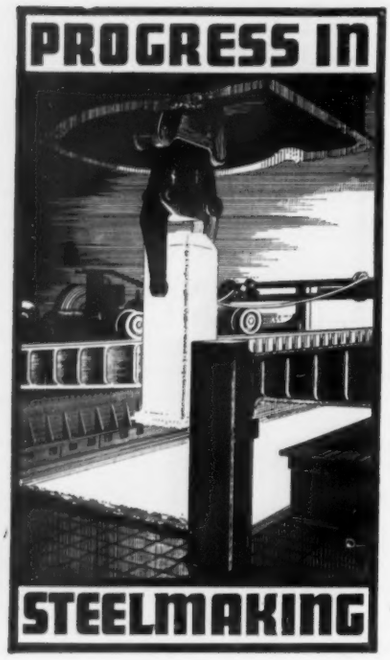
Material in process is kept on skids. These are usually live skids so they may be pushed manually from one operation to the next where loads are light and distances are short. Longer hauls to assembly lines are handled by industrial trucks which pick up the skids with their loads. Fig. 3 shows an operator welding mufflers. Here mufflers come to the operator from the previous step in a tote box on a wheeled skid. In operation, he loads them into his welder one at a time picking them out of a tote box on a wheeled skid as shown and placing them into a similar container upon completion of his work.

Combination crane and lift trucks, battery powered, are used in handling the heavy parts such as frames and engines. The crane is used to unload the units from the incoming cars onto heavy skid platforms which are then picked up by the lift unit of the truck and carried to the

(*Please turn to Page* 73)

Fig. 3—Parts in process, such as these mufflers, are handled in boxes on skids which are moved either manually for short distances or by truck for longer stretches

Fig. 4—Small parts move immediately from receiving department to assembly line eliminating costly stops in storage



Adds 3-High Mill

New equipment installed in sheet mill modernization includes friction pinion driving top roll of one mill. Foot pedals form an important feature aiding control of stands

■ PART OF a three-year modernization program, the recent installation of a 3-high balanced mill at Continental Steel Corp.'s Kokomo, Ind., plant and a 3-high jump mill at its Canton, O., plant together with necessary feeding furnaces, completes the mechanization of sheet mill equipment operating in the three plants of this compay. Both of these new mills were built by Continental Roll & Steel Foundry Co.

The jump mill at the Canton plant is equipped with rolls 62 inches long, one 20 inches in diameter and the other two 32 inches in diameter. Feeder and catcher tables are both of the tilting type. This mill is designed to roll sheet bars 10 to 16 inches wide and with a maximum thickness of 9/16-inch and maximum length of 52 inches. Material is reduced down to 18 to 22 gage in five passes.

This jump mill was placed at the No. 1 pack furnace. The No. 1 mill was moved in front of the double pair furnace which formerly supplied a 3-high Lewis balanced mill. This double pair furnace then was converted into a pack furnace to supply the No. 1 mill. The 3-high Lewis mill moved to a new location receives material from a new angle type furnace, 80 feet by 62 inches, which was installed to serve this mill.

At Kokomo, the new 3-high balanced mill is supplied by an 80-foot, 62-inch furnace, which is a duplicate of the one installed at Canton. Each of these furnaces has a heating capacity of 11 tons per hour.

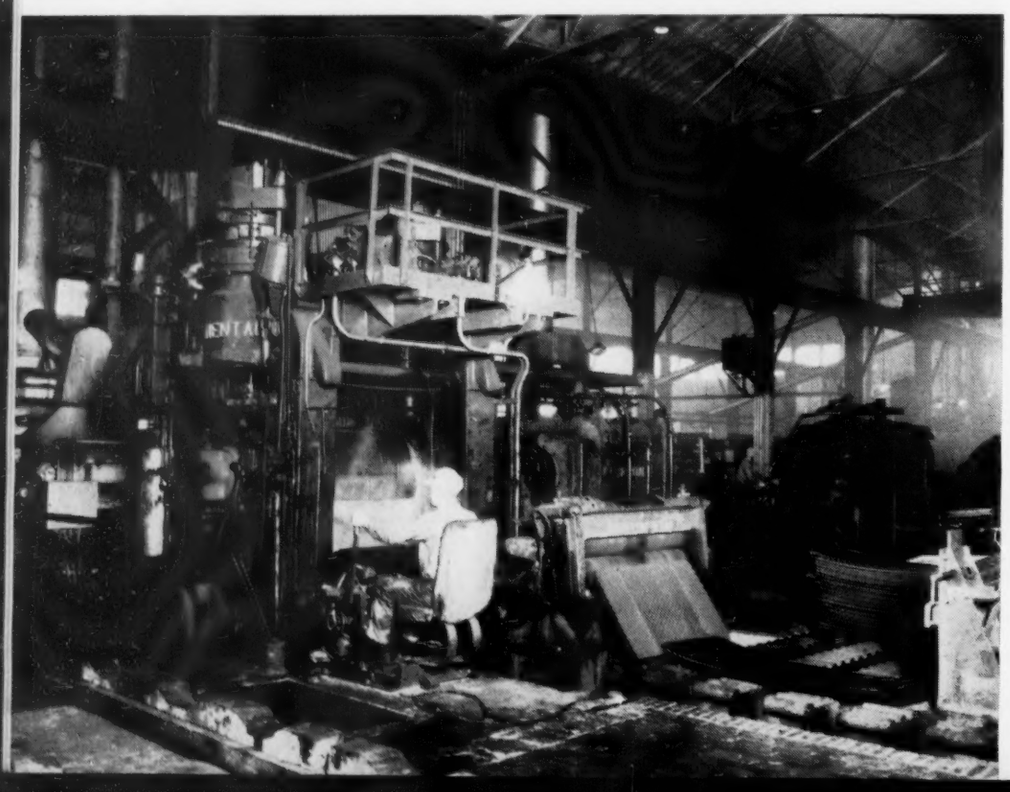
The 3-high mill at Kokomo is equipped with rolls 62 inches long, one 20 inches in diameter and the other two 32 inches in diameter. This mill also employs feeder and catcher tables and is designed for roughing bars 8 to 16 inches wide by 52 inches long, having a maximum thickness of 1¾ inches.

Designed for 15-Second Cycle

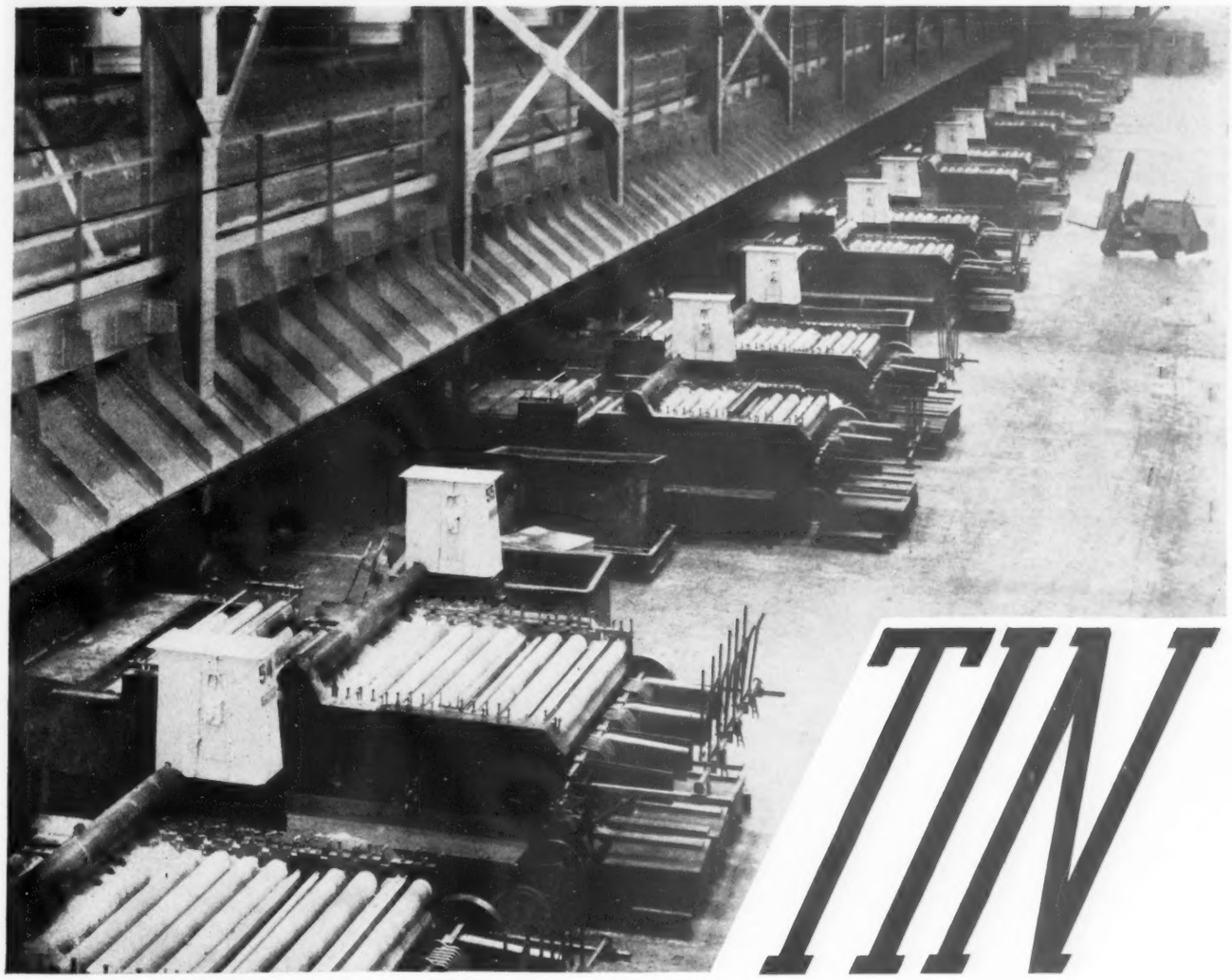
This mill has a 7-pass preset control which is designed for a 15-second cycle on 5 pass work, consisting of two single passes and three matching passes. A feature of this control is the use of foot pedals to actuate various controls. Tables raise or lower in 0.3-second. In order to provide middle roll balance fast enough for the table, a pneumatic type of balance is employed.

An interesting feature of this 3-high mill at Kokomo is the friction pinion used to drive the top roll. This friction pinion is a recent development and employs a design in which the friction disks are mounted within the pinion. Lubrication is by force feed. Nuts on a single stationary rod projecting at the rear of pinion housing afford adjustment. In fact, the friction pinion can be adjusted while the mill is in operation.

A new double 60-foot pack fur-



View in plant of Continental Steel Corp., Kokomo, Ind., showing one of mills included in recent modernization program. Photos courtesy Continental Roll & Steel Foundry Co., Pittsburgh



TIN

MAXIMUM PRODUCTION at MINIMUM COST

That's what Kemp Immersion Melting (with gas) is giving in *modern* tin stacks the world over. When tin pots are equipped for this better, faster, cheaper way of melting, no crew and no machine can out-step hot metal.

That's why the installation shown above was designed and built for Kemp Immersion Melting . . . making this an important part of one of the world's largest and most efifcient tin-plate mills.

Remember, *speed* is only part of the Kemp story. Kemp also gives you more accurate, fully automatic temperature control, less dross and material savings in fuel. For details address **The C. M. Kemp Mfg. Co., 405 E. Oliver St., Baltimore, Md., or Oliver Building, Pittsburgh, Pa.**

KEMP of BALTIMORE

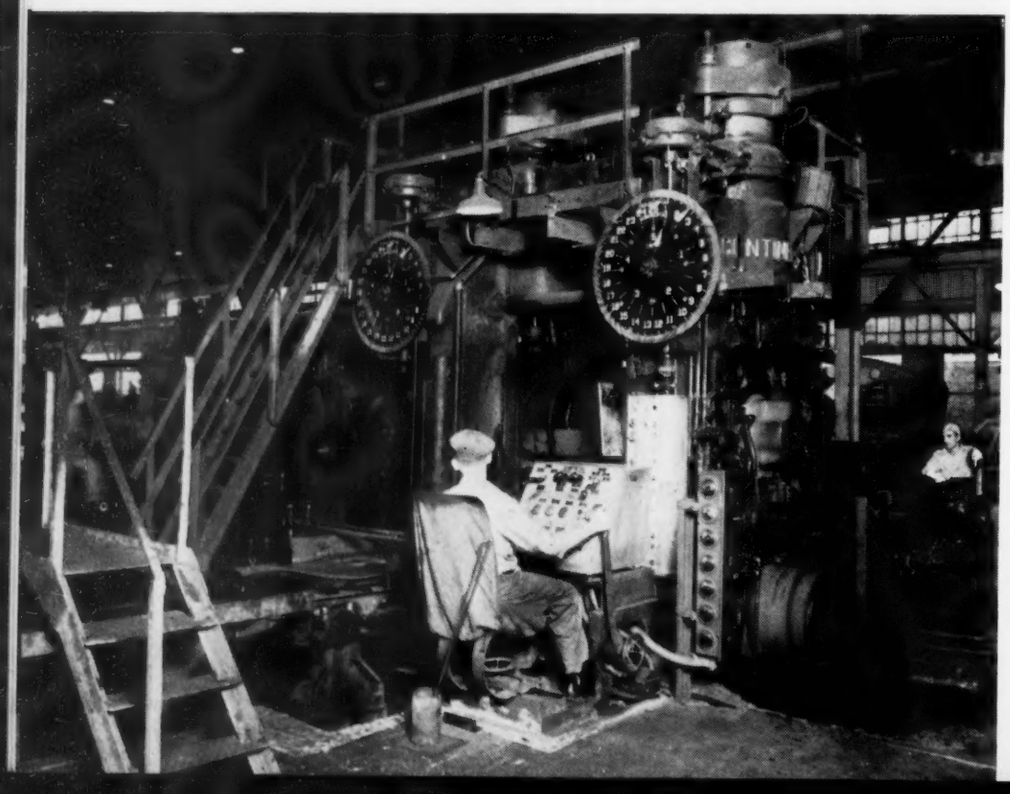
nace for handling 48-inch sheets, together with mechanical roller and catcher tables, and a Wahlert roll polisher were installed in connection with No. 5 finishing mill at the Kokomo plant. At both the Kokomo and Canton plants, hydraulic pusher cylinders from old pair furnaces were utilized for the construction of sheet bar elevators used in connection with the new 80-foot pair furnaces. These facilitate charging sheet bars at the rear of these furnaces and enable one man to handle all of the charging operations of a furnace.

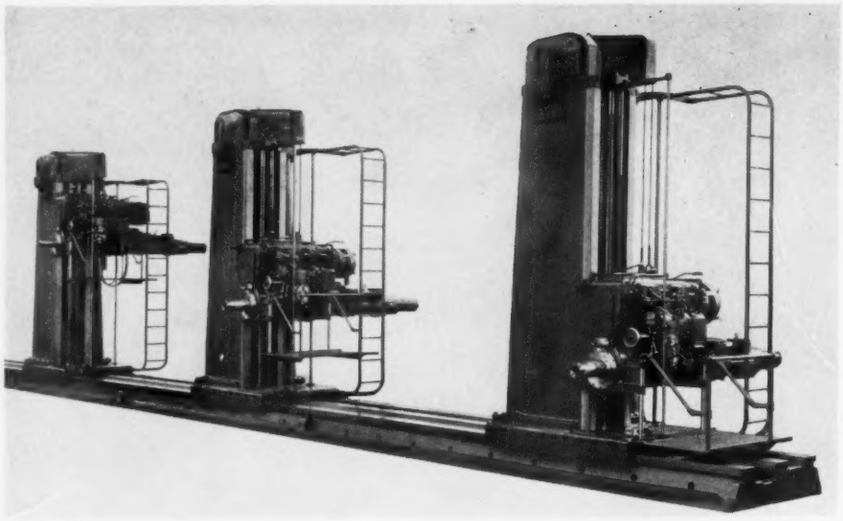
Supply Equipment

Wean Engineering Co., Warren, O., furnished the 80-foot pair furnace, 60-foot double pack furnace, mechanical tables for No. 5 mill and Wheelabrator equipment at Kokomo; also the 80-foot single pair furnace and new roll type doubler at the Canton plant.

All of the motors for the equipment in these improvements were furnished by Reliance Electric & Engineering Co., Cleveland, except the two screw-down motors on the 3-high balanced mill which were furnished by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The entire control equipment was furnished by Clark Controller Co., Cleveland. Motor brakes for feeder and catcher tables for both 3-high mills and for the screw-down on the balanced mill were supplied by Electric Controller & Mfg. Co., Cleveland. Conveyors were supplied by Mathews Conveyor Co., Ellwood City, Pa. Univan mill spindles and coupling boxes, excepting intermediate spindles for the 3-high balanced mill were furnished by Union Steel Casting Co., Pittsburgh. Lubricating systems were furnished by the Farval Co., Cleveland.

Closeup view of one of new mills in plant of Continental Steel Corp. Note the operator sits down, using pedals for some control operations





Mounted on a 102-foot runway, the three independent units of this machine are used for boring, drilling and milling large industrial engines, turbines and generators, as well as heavy girder assemblies

Triple Machine Weighs 115 Tons

■ IT TOOK six flat cars to ship the 230,000-pound triple high-power precision horizontal boring, drilling and milling machine shown in the accompanying illustration. Consisting of three independently operated floor type units mounted on a 102-foot runway, this equipment was developed by Giddings & Lewis Machine Tool Co., Fond du Lac., Wis., for the simultaneous machining of large marine and industrial diesel engines, water turbines, generators, and steam condensers, and can be used in steel fabricating plants for the boring, milling and milling of extremely large welded and riveted girders.

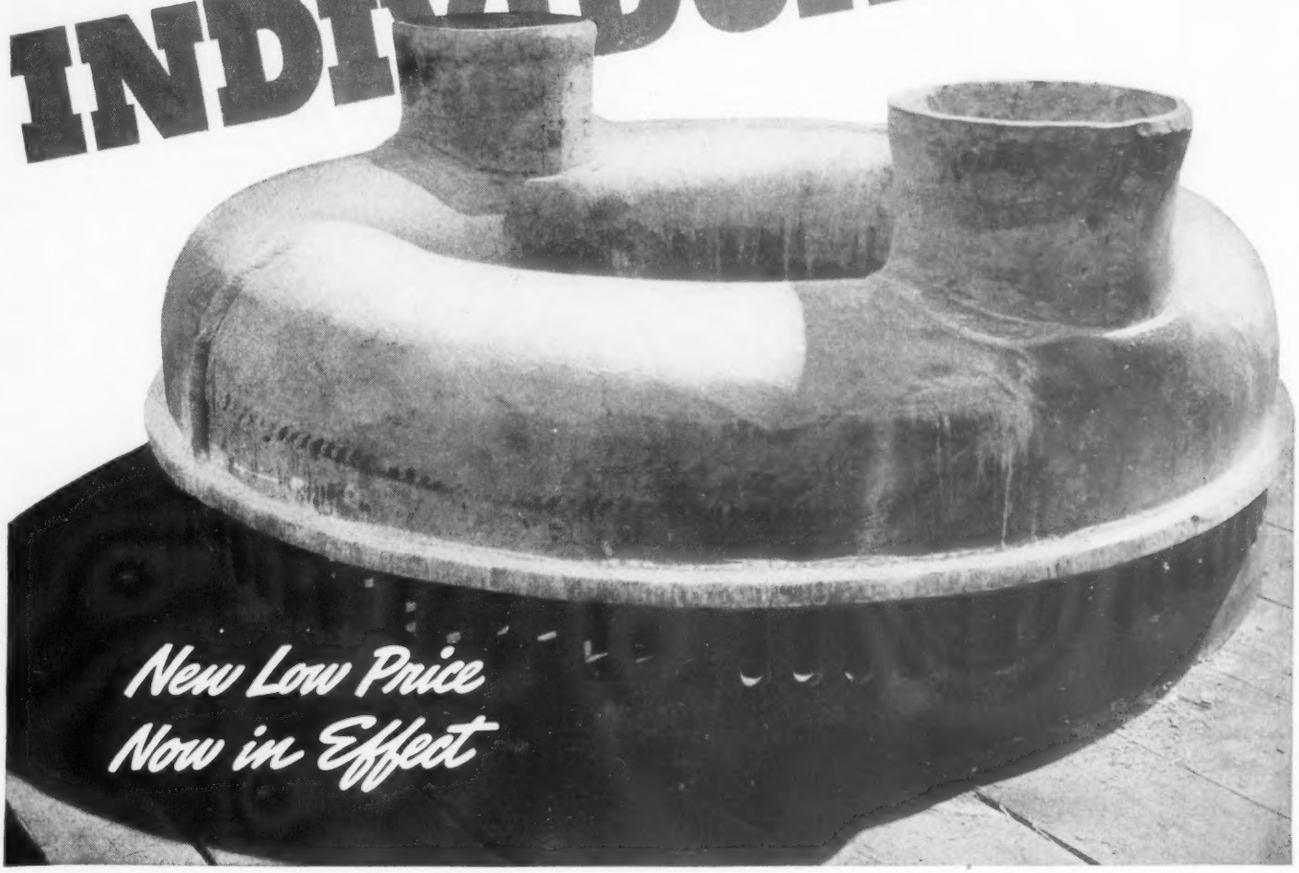
The three machine units have a headstock travel of 84 inches, and the maximum distance from spindle center of the first unit to spindle center of the third is 90 feet. Each machine is equipped with 6-inch diameter main spindle with 48-inch continuous feed, and 2-inch diameter high-speed auxiliary spindle with 9-inch continuous feed. Main spindle operates at 36 speeds from 6.25 to 375 revolutions per minute, and the auxiliary spindle at 36 speeds from 25 to 1500 revolutions per minute.

Entire mechanism for speed selection of spindles and feeds is built into headstock, operated through a dynamically balanced flange type 15-horsepower motor. Rapid traverse of each headstock on column and column on runway is 120 inches per minute.

Brick Design Provides Acidproof Construction

■ A patent has been granted Sauereisen Cements Co., Sharpsburg, Pa., for its design of an acidproof brick, known as Sauereisen Pour-Lay, a construction material particularly adapted to acid pickling tanks, sewers, floors, tunnels, etc. Design includes pouring cavities so arranged as to allow brick to be laid dry and in such manner as to present a smooth, solid surface without joints. A molten sulphur or asphaltic joint compound is used for sealing, no spacers or joint seals being required. Brick producers may obtain manufacturing rights.

THIS LEAD IS A RUGGED INDIVIDUALIST



RUGGED? Yes, very! Tellurium Lead is not only tough to begin with—it develops increased toughness under stress. *It work-hardens.* When rolled, stretched or hammered, it actually becomes stronger. As a result, turn-over points and joints are less subject to cracking.

Furthermore, where vibration occurs, this capacity to develop latent strength minimizes buckling and creeping. This same quality also gives Tellurium Lead improved resistance to fracture due to repeated heat changes.

INDIVIDUALIST? That word also describes Tellurium Lead. One outstanding point of individuality is its high resistance to corrosive acids. Even at temperatures that tend to approach the melting point of the metal, this lead shows unusual ability to withstand the attacks of sulphuric and numerous other destructive acids. In plant after plant, it has prolonged the life of equipment . . . and reduced the number of shutdowns for repairs.

Tellurium Lead of our manufacture is St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantages of this time-tried chemical lead plus important new ones. Yet now, due to a price reduction, it costs only a fraction of a cent more per pound than chemical lead. Tellurium Lead is available in sheets, pipe and coils. For further facts, write to nearest branch.

Typical User Reports

"I wish to say that your Tellurium Lead pipe has proved all you claimed. It is easy to weld and easy to flange. Also the flanges stand up a good deal better than ordinary lead as they seem to actually become stronger at the turn-over point."

Another company writes: "Our coils are used in a dilute sulphuric acid solution. The lead coils previously installed gave comparatively short service (about 6 months). Tellurium Lead coils have been operating continuously 24 hours a day for one year and as yet no blow-outs have occurred. No repairs have been necessary."

NATIONAL LEAD COMPANY

New York, Baltimore, Buffalo, Chicago, Cleveland, Cincinnati, St. Louis; National-Boston Lead Co., Boston; John T. Lewis & Bros. Co., Philadelphia; National Lead & Oil Co., Pittsburgh; Georgia Lead Works, Atlanta; Gibson & Price Co., Cleveland; American Lead Corporation, Indianapolis; Master Metals, Inc., Cleveland; The Canada Metal Company, Ltd., Toronto, Montreal, Winnipeg, Vancouver.

Tellurium Lead

Boiler Fabrication

Obtains 60 per cent decrease in welding time per boiler, 35 per cent cut in electrode consumption, 70 per cent lowering of power and maintenance costs using A.C. welders

■ TWO MAJOR programs at the Geneva, N. Y., division of Burnham Boiler Corp., have produced remarkable results in the manufacture of low-pressure heating boilers. As first part of this program, manufacture of riveted boilers and tanks was discontinued and a large part of equipment scrapped since it was unsuitable for making welded boilers. Improved production control and similar foresighted changes formed the second part of the program. Benefits obtained paid for the new equipment in eight months.

Range of sizes of boilers made in this plant calls for plate varying in thickness from ¼ to ½-inch. The raw steel used is of flange and firebox quality with small quantities of tank plate used for smoke boxes and other parts which are not water-backed and not subjected to heat. Plate for heads and shells are received from the mill approximately the correct size and with sufficient stock for squaring. They vary in size up to about 12 x 30 feet.

Due to the limitations of space and the comparatively large investment required for shearing machinery, it was deemed advisable to flame-cut the plate. This method has proved quite satisfactory, as one man operating an automatic oxyacetylene machine can square or cut up the largest sheet in a short time without assistance. A later development, residential oil boiler, was designed to take advantage of this method of cutting, the design being such that three odd-shaped pieces are produced from one plate in one setup through a sort of "nesting" with practically no scrap. The only other way the parts could be produced would be by means of an extremely large press in two operations. On the small boilers, several plates are piled on top of each other and all are "stack cut" at the same time. Standard punch presses are used to produce staybolt holes and tube holes.

The shapes of the boilers are such that all forming can be done on pyramid rolls. From three to five plates are rolled at a time for the small boilers.

All the shapes come to the assembly stations and are set up on level surfaces where the component parts are assembled in their respective places by the "tackers." Small 150-ampere transformer type welders are used. A sufficient number of "tacks" or light welds are made using a light wire to hold the boiler together so boiler can be moved by the crane to the welding stations.

While much thought has been given to jigs and fixtures to facilitate handling during welding of large boilers, no practical method has presented itself as yet. The weight of a "Compact" boiler varies from 1 to 15 tons and there is a corresponding difference in size. A fixture to swing a bulk whose dimensions are 7 x 12 x 15 feet is a problem in itself.

Welding stations are served by one large and two small cranes. Pro-

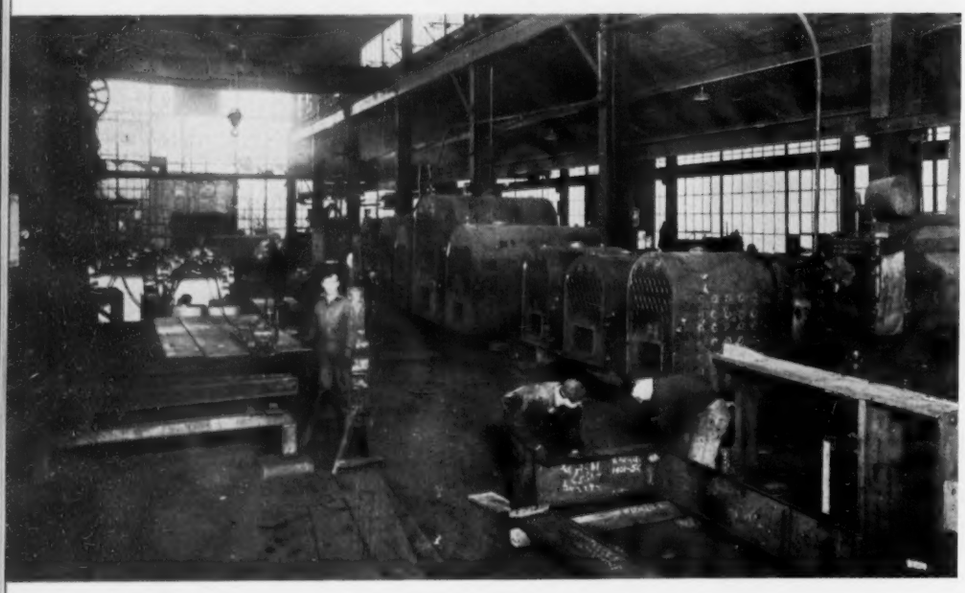


Fig. 1—Large reduction in reworking of welds through use of alternating-current machines is reported in boiler shop shown here. Photos courtesy General Electric Co., Schenectady, N. Y.

cedure has been worked out where the boiler must be positioned four times to complete welding, or about every two hours on an average size unit. Residential boilers are set up in simple jigs. One fixture is used for welding.

Formerly direct current, motor generator sets were used exclusively; first with bare wire and later with coated rod as it became perfected.

There are several points in the boilers at which some trouble was experienced with "arc-blow." This was particularly true in corners. When a defective weld showed up under test water would have to be drained out, boiler moved from test block back to welding station and the defective weld chipped out. After repair it would again have to be tested.

When the decision was made to purchase new and larger welding machines, several direct-current machines were tested, but the company was not entirely satisfied with the results. A decision was made to try alternating current sets and while so far as was known they had never been used to fabricate low-pressure boilers, several companies had been getting good results in the high-pressure field. Two 500-ampere, transformer type welders made by General Electric Co., Schenectady, N. Y., were purchased with a new coated rod suitable to the work.

All welding now is done in the down-hand position using a fillet weld on seams with complete positioning of the work. It was noted that operators used much higher heats of their own accord with a corresponding increase in speed. Heats used eventually were more than 100 per cent higher than with direct current.

Costs Greatly Reduced

Records kept since the changeover show a 75 per cent reduction in cost per foot of weld. Factors in this reduction are a 60 per cent decrease in welding time per boiler, a 35 per cent cut in the amount of electrode consumed and a 70 per cent lowering of power and maintenance costs.

Returns from the testing block and the labor of caulking pin holes have been almost entirely eliminated. Seemingly less manual dexterity is necessary to secure a solid and smooth weld. Operators also express satisfaction from increased speed and ease of work.

Since all operators are trained in the plant, it has been noted that instruction period required to train a new operator has been reduced considerably since installation of the alternating current equipment. Actual welding time per hour has been increased as operators now draw an arc a total of 40 minutes out of each hour. A reduction in standby loss, due both to lower excitation loss on the machine and less idle machine time, has been reported.

While the application of automatic welding heads has been studied, the many different irregular shapes would increase setup time to such an extent that their use appears impractical at present.

After welding, the boiler tubes are rolled and beaded in. The boiler is tested and miscellaneous parts attached. Through planning, careful routing and rearrangement of processes with the changes described, considerable savings have resulted.

Arc Welding Manual For Practical Worker

■ *Arc Welding*, paper, 218 pages 5½ x 8 inches; published by Hobart Bros., Troy, O., supplied by STEEL, Cleveland, for 50 cents; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

A manual and operator's training course, this pocket volume makes available the lessons given in the arc welding school maintained by the Hobart company. The material is arranged in the form of lessons covering practical exercises and welding of various metals. Drawings and illustrations show best positions for placing work and electrode to insure maximum strength.

Printed in clear type on high-grade paper it is designed to withstand rough use in the shop, where it should be kept for ready reference.

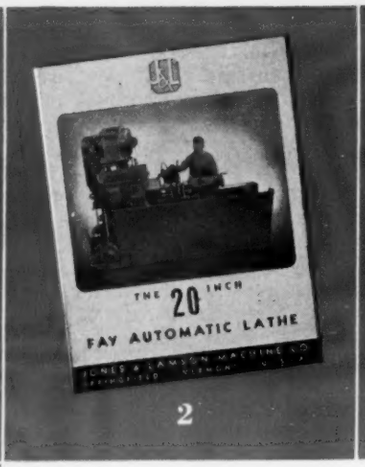
Dangerous Vapors Are Detected by Instrument

■ Invisible and poisonous fumes now can be detected by a scientific instrument which causes their presence to become known through these vapors actually casting their shadows in plain sight. This detector has been developed by T. T. Woodson, General Electric research laboratory, Schenectady, N. Y.

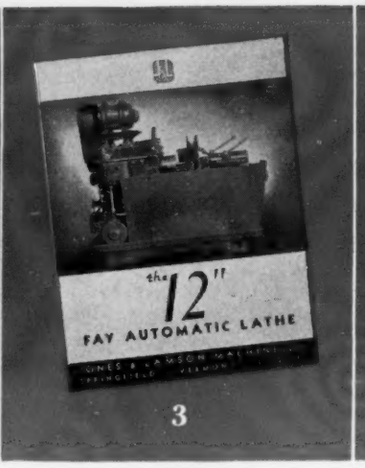
Shadows are obtained by use of the physical law that any vapor will absorb the same color of light it emits when excited. Detector uses a lamp giving such colors. Samples of air loaded with the vapor are forced through a tunnel lighted by this lamp, result being a slight shadow that is picked up by the photo-electric tube stationed at the tunnel. An extremely small amount of vapor is sufficient to force the tube to turn on a red light, showing presence of the poison.

Fig. 2—All boiler welding is done in down-hand position with complete positioning of the work. Jib hoists aid in locating work

1

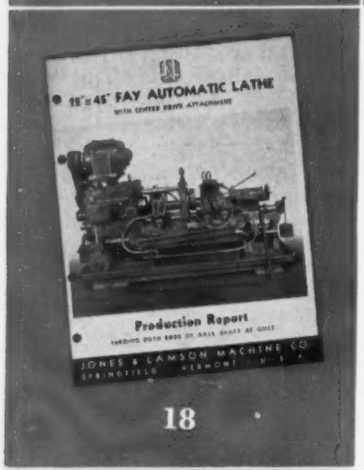


2



3

4



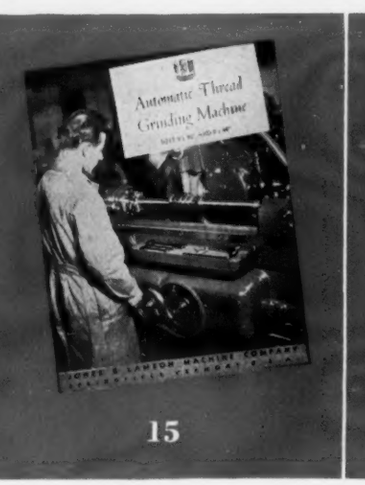
18

17

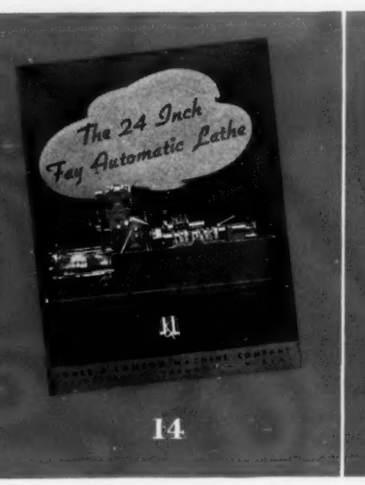
Complete literature

J & L presents, on these pages, the most complete line of descriptive booklets and folders that it has ever offered to production executives. This literature is as complete as the line of machines which it describes — a line replete in productive and labor saving features. Whether your work deals with machining operations or inspection work, or both, these booklets will be interesting and valuable. The coupon is for your convenience — mail it today!

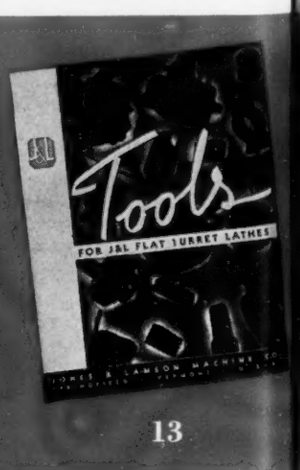
16



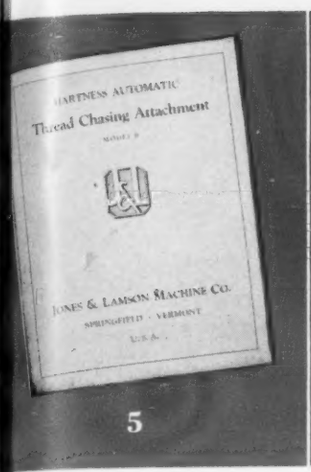
15



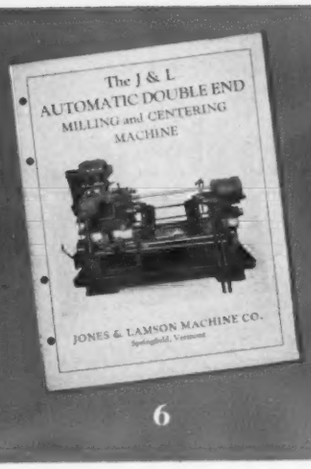
14



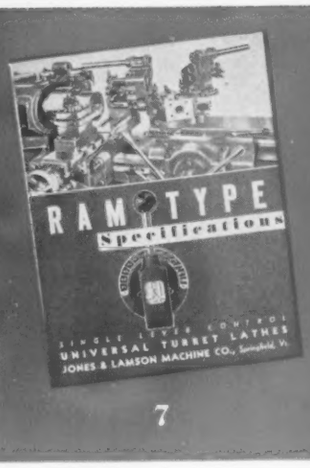
13



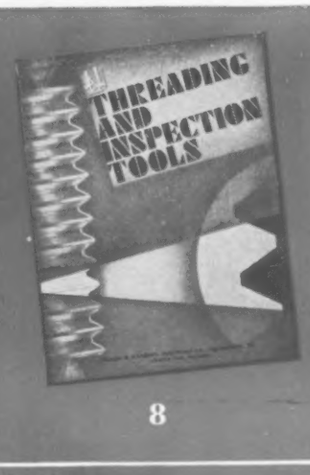
5



6



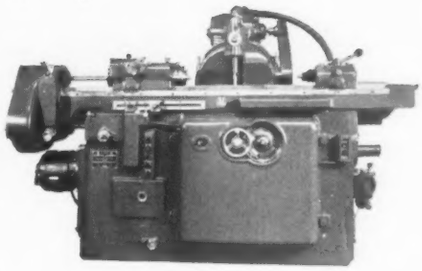
7



8

DESCRIBING A COMPLETE LINE

Catalogue #15 describes in detail all the outstanding features of the J & L. Automatic Thread Grinding Machine. The standard J & L Thread Grinder will grind right- and left-hand threads from 2 to 48 pitch inclusive; threads with single, double, triple, quadruple, quintuple, or sextuple lead; from the solid or previously roughed threads. With a simple former it will handle taper threads. With standard attachments it will handle every possible type of thread grinding work.



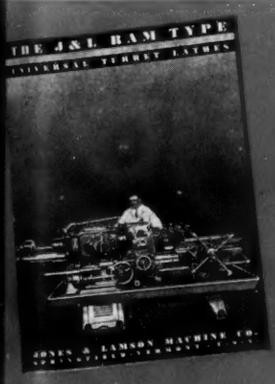
J & L AUTOMATIC THREAD GRINDING MACHINE

9

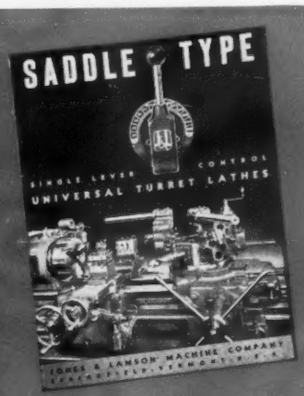
10

JONES & LAMSON MACHINE COMPANY

Springfield, Vermont, U. S. A.



12



11

YOURS FOR THE ASKING

Gentlemen:

Without obligation please send the following literature which I have checked below.

Please have your representative call. ☐

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Name . . . . . *Title* . . . . . .

Company . . . . . .

Street . . . . . *City* . . . . . .

S

Hardenability

Symposium attempts to promote a better understanding of the internal and external factors which influence the hardening characteristics of low and medium alloy steels

■ CHEMICAL analysis, "personality" or timbre, grain size, and now hardenability, are coming to be accepted means of identifying heats of steel so that both steelmakers and users will have accurate forehand knowledge of how various steels will behave in fabrication, treatment and service.

High spot in the annual convention of the American Society for Metals during the recent National Metal Congress in Detroit, Oct. 17-21, was a three-session symposium on hardenability of medium and low alloy steels at which the findings of a dozen research workers on this timely subject were reported, while a score of other metallurgists contributed in the form of discussions.

The American Society for Metals eventually will have complete details of this symposium available in printed form; in the meantime, STEEL herewith presents a comprehensive abstract of the technical contributions and discussion, in the belief that much of the comment was of real, practical value, notwithstanding the fact that some of the discussion soared into the higher flights of metallurgy and mathematics.

■ HARDENABILITY of steels is a subject of great importance to the steel producing and steel using industries today, as evidenced by the large volume of material being written about the matter, and the lively discussions which spring up whenever metallurgists gather.

In presenting some of the research findings reported at this symposium, it is probably well to start with the fundamentals and to throw some light on just what the term hardenability means. This was done effectively by B. R. Queneau, Columbia university, New York, and W. H. Mayo, metallurgist, Homestead Steel Works, Carnegie-Illinois Steel Corp., Pittsburgh, who after a broad review of literature on the subject reported that while there is much widely accepted information concerning hardenability, it is difficult to find a clear definition of the term.

There has often been confusion in the minds of heat treaters between the ability of a steel to attain a certain hardness and the depth to which the steel would harden under various quenching conditions. It is now generally agreed that the term "hardenability" has nothing to do with the intensity of hardening, that is, the maximum hardness of the martensite formed, for this is in large part a function merely of the carbon content. Rather, it relates in its most familiar aspect to the extent or depth of peripheral martensitic hardening obtained when the piece of steel quenched is too large to be hardened completely through. However, an analysis of the variables which govern the depth of hardening, when they are considered in their relation to present commercial practice, calls for further limitation of the meaning of the word.

The factors which affect the depth of hardening may be grouped in two categories. The factors are as follows:

A. Factors largely inherent in the steel.
   1. Austenite composition.
   2. Austenite grain size.
   3. The amount, nature and distribution of insoluble or undissolved particles in the austenite.

The above factors are dependent upon inherent properties in the steel; they determine the critical cooling rate and are fixed by analysis, deoxidation practice, prior structures, quenching temperature and the time of heating to, and holding at, that temperature.

B. Factors largely external to and independent of the steel.
   4. Size of specimen.
   5. Condition of the surface.
   6. Heat abstracting power of the quenching medium.

The heating of a particular grade of steel has been largely standardized, particularly in any one consumer's shop, and much the same may be said of the quenching bath and the handling. Therefore, it becomes possible to assign a certain specific degree of hardenability to all the uniform bars of a lot (that is, generally speaking, a heat) which, regardless of size, are to be handled in effectively the same way in a standardized heat treating operation; standardized with respect to all those influences which may have any effect on the factors inherent in the steel itself.

To express this concept briefly, "hardenability" is that characteristic of a heat of steel which determines its capacity to harden throughout when quenched; it is a direct function of the critical

An etching by one
Edmund Hellmer, portraying
"THE ALCHEMIST"
(No data is available as to the
original painting)

Ohio Ferro-Alloys Corporation
Canton, Ohio

Reprinted by permission D. D. Berolzheimer, 50 E. 41st St., N. Y. City.

cooling rate and as such is independent of external quenching conditions.

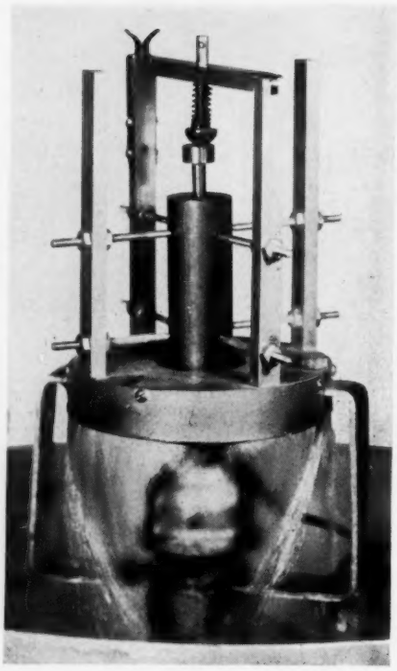
To obtain a thorough knowledge of the hardenability of a heat of steel, a fundamental study of reaction rates of the steel should be made. However, this is a long and laborious process and could not be applied to commercial control. A determination of the critical cooling rate is another possible method of measuring hardenability, but this likewise involves a complicated experimental procedure. Furthermore, there is no ready means of calculating the depth of hardened case on a sample from the reaction rates or critical cooling rate of the steel. Various more practical methods have been proposed, usually consisting of the measurement of the depth of hardening of a standard size round quenched under standard conditions, the measurements being made either by a hardness survey or by visual examination of the polished and etched specimen.

A simple, rapid and reproducible method of obtaining an index of hardenability consists of plotting the fractional depth of hardening for various size rounds against the inverse square of the diameter. A straight line through the points is called the hardenability line. This method holds only when a hardened case is obtained under uniform heating and quenching conditions.

The hardenability line can be obtained from two specimens and, in most cases, without the use of the microscope or a hardness testing machine.

By the use of the hardenability line it is known that with a given heat treating procedure, it is possible to predict the depth of hardness in a sample of any commercially hardenable size and of any one of the three simple shapes (spheres, rounds and flats).

■ THERE is no nationally accepted standard for measuring the hardenability of steel. In the tool steel field the test which comes nearest to general acceptance is perhaps the Shepherd P-F test. The test described by A. L. Boegehold and W. E. Jominy, research laboratories division, General Motors Corp., Detroit, last year for carburized steels has now been applied to medium carbon steels, and this application was discussed in detail by Mr. Jominy in a new paper. By using this test it is possible to determine what the hardness would be at the center of a bar 4 inches round after quenching in oil or water although the test sample itself is only 1 inch in diameter and 3 inches long. It is also possible to determine the center hardness of a 3-inch round bar or a 2-inch or for any size from 4 inches down to ½-inch in diameter, whether quenched in oil or water, by this test.



Modified quenching fixture in which water strikes bottom face only of test specimen. From paper by W. E. Jominy

This test, as described by Mr. Jominy, consists of heating a test specimen to the desired hardening temperature and then extracting the heat from one end of the bar. In this way cooling rates of various magnitudes are obtained along the test specimen. This specimen is 1 inch in diameter and 3 inches long with one end cupped and fitted with an adapter. The method of cooling consists in spraying water at 75 degrees Fahr. into the cupped end of the bar. The modified quenching fixture is shown in an accompanying illustration. The opening in the pipe through which the water travels is ½-inch and the height of the water column before placing the sample in the fixture is 2½ inches. The spout from which the water is released is ½-inch below the water-cooled face of the test specimen.

The hardness is then read at definite intervals usually ⅛-inch apart along the bar from the water-cooled end to the adapter end. It has been found desirable to make hardness readings at 0.015-inch below the surface of the bar. This is accomplished by grinding a flat 0.015-inch deep along the entire length of the test bar and taking the hardness readings here.

The cupped end of the specimen may be eliminated and a plain or square end used provided a fixture is available for quenching. This fixture is so constructed that when the test piece is clamped in place the stream of water strikes only the bottom face of the test piece.

In making any kind of hardenability test it is well to bear in mind that hardenability is really a relationship between rates of cooling, hardness and microstructure.

It would appear to be advantageous to think in terms of rates of cooling instead of arbitrary bar sizes especially since service parts usually do not correspond in shape to any standard bar.

For example, consider a Chevrolet rear axle drive pinion. The rate of cooling of this pinion has been determined at a point corresponding to the center of the gear tooth at the base when the pinion was quenched from 1700 degrees Fahr. into strongly agitated oil. The rate of cooling at this point at 1300 degrees Fahr. was found to be 55 degrees Fahr. per second. If full hardening at the center is desired a steel which will be fully hardened with a cooling rate of 55 degrees Fahr. per second would be needed.

It will be apparent that in testing a steel suitable for this part a 1-inch round bar quenched in water cannot be used since the rate of cooling at the center of such a bar is too fast (180 degrees Fahr. per second). The rate of cooling at the center of a 1-inch round quenched in oil would be just a little slower than the cooling rate of the pinion and the steel could be tested after such a quench. Or a steel that would harden to ⅜-inch on a standard test bar (cooling rate at this point is 55 degrees Fahr. per second) would be suitable.

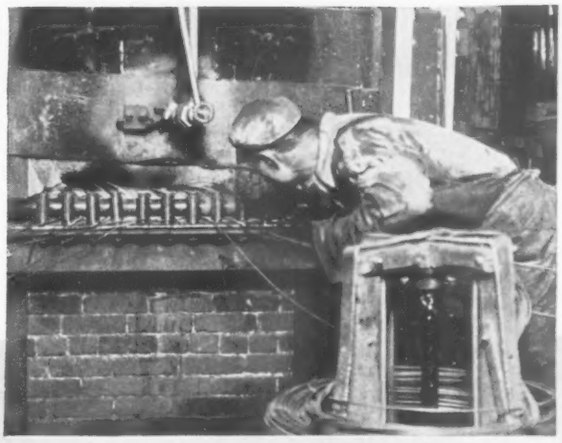
It probably is not convenient or practical to make cooling rate tests on many service parts. On the more important parts, however, it would seem to be practical to make the part in question and the standard hardenability bar from the same bar of steel and find the distance on the hardenability bar which corresponds in hardness to the center or whatever point is desired of the service part.

■ A DEFINITE relationship between hardenability, as expressed by the area under the hardenability curve of a 1-inch round, and chemistry and grain size was shown in a paper by John L. Burns, mill metallurgist, Republic Steel Corp., Chicago District, and Glen C. Riegel, chief metallurgist, Caterpillar Tractor Co., Peoria, Ill. Surface hardness is dependent solely on carbon content when the critical cooling rate is attained or exceeded; the depth of hardening depends upon the chemistry of the steel and the

PATENTING

GIVES TOUGHNESS TO HIGH CARBON WIRES

22nd in a series of advertisements designed to help you make a better selection of wire for maximum value per unit of cost.



The patenting furnaces in the Wickwire Spencer Mills are automatically controlled to within 5 degrees F. The instruments that control the furnaces continuously graph the temperatures and periods for use as case history records of all Wissco Wire so processed.

High carbon wires are essentially strong. With proper heat treatment before drawing to finer sizes, this strength may be combined with high ductility thus producing wire of extreme toughness. This heat treating, called "patenting", produces by a controlled cooling from a relatively high temperature a structure which permits drawing to high tensile strengths with a minimum loss of ductility.

Patenting is a delicate process and requires accurate control of temperature and speeds to produce satisfactory and uniform results. Long experience has taught Wickwire Spencer how to use the patenting process to give a high carbon wire predetermined characteristics. Close control and correct analysis impart the high uniform quality to Wissco High Carbon Wire.

WICKWIRE SPENCER STEEL COMPANY

New York City, Buffalo, Chicago, Detroit, Worcester. Pacific Coast Headquarters: San Francisco. Warehouses: Los Angeles, Seattle, Portland. Export Sales Dept.: New York

Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Dent Spacer Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

WISSCO WIRE
by Wickwire Spencer

austenite grain size at the quenching temperature. It is not believed that there are other "mysterious" factors influencing hardenability of practical significance. Chemical segregation is found to be a minor but noteworthy factor.

Will Simplify Testing

Among the authors' conclusions were:

The difference in hardenability between fine and coarse-grained steels is approximately constant in steels up to 0.35 per cent carbon. From this point to 0.50 per cent carbon the difference becomes increasingly greater with increasing chemical factor.

The effect of carbon upon the area under the hardenability curve seems to be less with increasing carbon content.

Steel ordered for a specific purpose has heretofore required considerable "cut and try" testing—testing in the finished product, too often in service. Data given by the authors should largely eliminate this testing by making possible the translation of the desire of the purchaser (required mechanical properties) into the steel manufacturer's terms (chemistry and grain size).

O. W. McMullan, Youngstown Sheet & Tube Co., Youngstown, O., in commenting on the discussion of Messrs. Burns and Riegel, said he hoped they were correct in their statement that depth of hardening depends upon chemistry and austenitic grain size at the quenching temperature, and that no "mysterious" factors are of practical significance. However, he gave as his belief the fact that commercial heat treaters would probably disagree with this viewpoint. He observed that the authors' test specimens did not include such factors as variation in surface finish, scaling and decarburization, effect of water temperature and impurities, size and shape of specimens on heating and quenching, necessity for avoiding cracking and distortion, and the like which confront shop operators.

Mr. McMullan noted that the practical success of certain jobs may even depend upon not getting uniform cooling, and added that those who have dealt with abnormality and soft spots in case-hardened plain carbon steel in the absence of differences in grain size and chemistry may not be willing to concede the absence of mysterious factors.

Limitation of the term "hardenability" to mean only the ability to harden to a certain depth in a standard specimen was questioned by A. S. Jameson, International Harvester Co., Chicago; he believed that the ability of a steel to have uniformity of surface hardness should also be included, since the ability of a steel to harden uniformly within certain limits is of practical importance. He suggested a 10-point hardness range as a reasonable variation for steels with carbon content of 0.35 per cent and over.

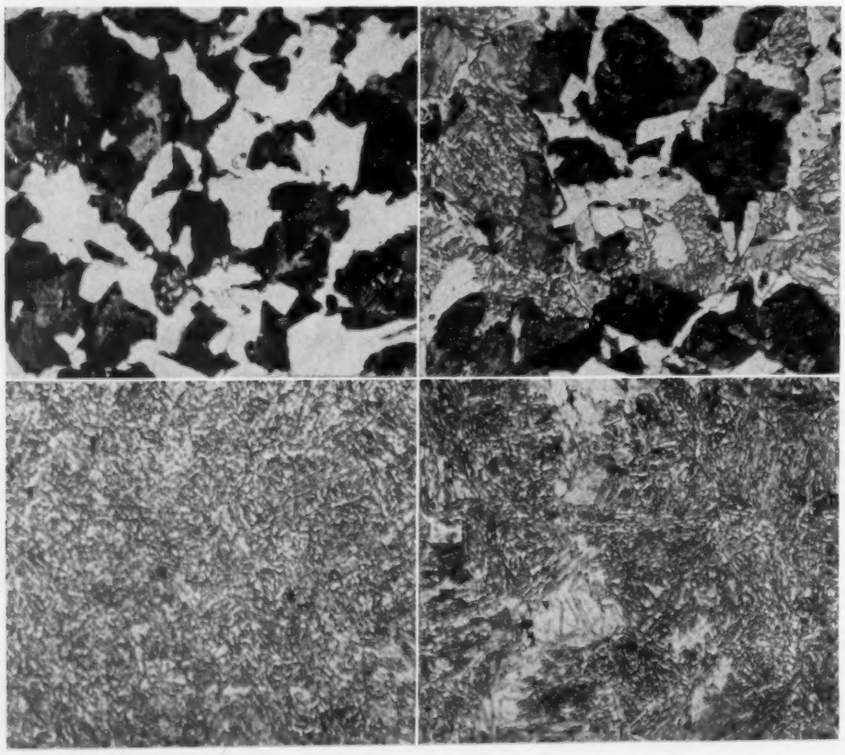
Specifying of a hardenability range on those parts requiring close limits was suggestetd by H. E. Ardahl, John Deere Tractor Co., Waterloo, Iowa, who pointed out that the hardenability of S.A.E. plain carbon steels varies considerably from the minimum to maximum chemistry range, which in turn is responsible for a considerable variation in behavior of the steels in hardening and also for a considerable variation in the physical properties obtained. Significantly, he observed that "with a simple standard measurement of hardenability it is entirely possible that steels will be purchased on the basis of hardenability as well as chemistry and grain size in the near future."

■ HARDENABILITY of low-chromium steels was investigated by Walter Crafts and John L. Lamont, research metallurgists, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y. In their research, engineering steels containing up to 3 per cent chromium were normalized, oil quenched and water-quenched to determine predominant hardening characteristics and the relations existing between mechanical properties and microstructure.

In summarizing the hardening characteristics of normalized chromium steels, it is evident that manganese plays a large part in controlling the formation of homogeneous structures having high ductility. In general, a relatively low manganese content permits greater latitude in the carbon and chromium contents and results in better properties over a wider range of tensile strength. High (0.80 per cent) silicon also has a beneficial influence by increasing the strength and ductility, by extending the fields of homogeneous microstructures and by reducing the effect of mass.

The higher carbon pearlitic 1 per cent chromium steels have adequate ductility for use in applications requiring little impact strength and for processing prior to ultimate heat treatment. The relatively soft and readily machined pearlitic 2 per cent chromium steels are characterized by an unusually large strength differential between the air-cooled and the quenched and drawn conditions. In the low-carbon structural steels chromium has a toughening influence. The 3 per cent chromium steels of the pseudomartensitic type are largely used in the normalized condition where their high strength, ductility, toughness and resistance to wear and mass effect are utilized.

The primary role of chromium in



Microstructures of normalized chromium steels. X500. (Upper left) Ferrite and pearlite; (upper right) ferrite, pearlite and pseudomartensite; (lower left) pseudomartensite; and (lower right) pseudomartensite and martensite. From a paper by Walter Crafts and John L. Lamont

quenched steel is to promote uniform and deep hardening so that the hardness and microstructure are practically the same at the center as at the surface. Fractional percentages of chromium are, however, used in carbon and manganese steels to assure uniformity in hardening, and it may be seen that such steels retain their shallow-hardening characteristics.

Deep-hardening chromium steels may be divided into two types, of which the 1 per cent chromium class is characterized by a structure consisting of pseudomartensite and martensite. It may be inferred from the data that both typical water-hardening 1 per cent chromium steels containing somewhat less than 0.40 per cent carbon, and oil-hardening 1 per cent chromium steels containing somewhat more than 0.40 per cent carbon would harden deeply in sections up to about 1½ inches in diameter.

Ferrite is almost suppressed in quenched steels of this type, and the structure of pseudomartensite and martensite can be readily tempered to produce a high order of strength and ductility. The manganese content may be varied over a wide range without producing a major change in the character of the steel. With less than 0.60 per cent manganese the steel is less liable to distortion during quenching, and with more than 0.60 per cent manganese the surface will harden more readily.

The second group of deep-hardening chromium steels is that containing somewhat over 1.5 per cent chromium in which the microstructure consists wholly of martensite. Steel of this type is ordinarily used for some specific purpose, such as wear resistance, and for severe duty in heavy sections. High manganese steels of this type tend to crack during quenching, so that a low manganese content is essential.

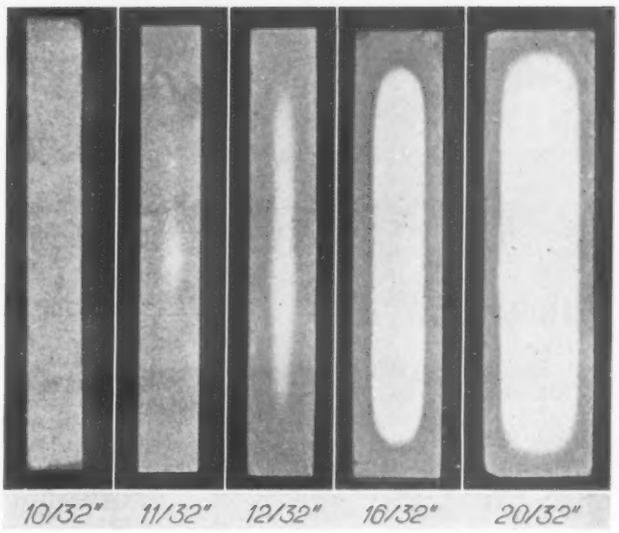


Illustration of critical section in 1.10 per cent carbon steel as related to hardness penetration; quenched in brine at 1450 degrees Fahr. From paper by G. V. Luerssen

■ SUMMARY of present knowledge of the factors affecting hardenability in small sections was outlined by G. V. Luerssen, plant metallurgist, Carpenter Steel Co., Reading, Pa. The subject was discussed under the heads of treatment, design and quenching media.

It is a fairly well established fact that carbon content determines the ability of a steel to surface harden, while the percentage of other elements such as manganese, chromium, etc., determines its ability to depth harden. In sections sufficiently light to enable a plain carbon steel to harden entirely through, the addition of alloys consequently will add no strength to the part.

However, there are several reasons for adding alloys. One is to increase depth hardening in larger sections and thus increase the overall strength. Another is to increase ductility and consequently toughness.

Similarly there are cases in which the predominating factors are wear resistance, fatigue resistance, freedom from warpage in quenching, and here alloys are used for purposes entirely foreign to that of obtaining penetration qualities. In such instances the quantity of alloy necessary to accomplish the purpose is usually more than sufficient to cause uniform hardening throughout in thin sections.

The subject of inherent properties of steel with regard to its response to heat treatment is one which has received so much attention in the past few years that little need be said here by way of introduction. While the term is now commonly used to explain behavior not accounted for by the presence of elements usually determined, all hardenability phenomena must ultimately be explained by chemical structure.

The most important of these effects is that of developing characteristic grain size upon heating over the critical, and it has been observed for many years that given two steels of substantially equal composition, one may develop a fine-grained structure on the quench and the other a coarse-grained structure. The important fact is that the steels which develop the coarser grained structure will harden deeper, and in light sections this effect will at times be quite marked.

The marked effect of prior treatment and structure upon hardenability in light sections is now well established.

A preliminary treatment to absorb carbide in the hypoeutectoid steels results in deeper hardening as compared to annealed initial structures, while a similar preliminary treatment in the hypereutectoid steels results in shallower hardening when these steels are quenched at what might be termed their normal hardening temperature.

The necessity of controlling the preliminary structure in the hardening of critical sections where uniformity in the final product is desired is apparent. In general a spheroidized structure is desirable on account of its easy reproducibility, stability, ease in machining, etc. Conversely, however, the application of preliminary treatments is a convenient means of securing special effects in the final hardening operation.

Design Exerts Influence

While design is not strictly a factor in hardenability, since it obviously cannot have a direct effect on the behavior on quenching, nevertheless it has an important indirect effect on the final result of quenching. The indirect effect is that of variation in the rate of heat extraction on quenching due to difference in contour of the surface.

Every hardener who has looked at a fracture or an etched section of a hardened tool or part is familiar with the corner or edge effect in quenching, that is the deeper penetration occurring under the re-entrant angles. It is doubtful, however, that the influence of curved surfaces has been fully recognized. In this connection, it is becoming common practice to evaluate hardenability of tool steel on the basis of cylindrical specimens. In order to make such tests generally applicable, it will be desirable either to standardize the diameter of the specimen, or to correct all such tests in terms of some standard surface such as a flat.

As in the case of design, while quenching medium cannot be con-

sidered one of the factors in hardenability, still variations either in the medium itself or its application may have marked effects upon final result in hardening small sections.

Surface conditions of the part as influenced by mode of heating will have some effect on heat transfer and consequently upon hardening. It is common knowledge that some types of scale resulting from atmospheric conditions in the hardening furnace retard the quench, although such difficulties may sometimes be overcome by proper selection of quenching medium.

To summarize the entire subject of quenching media and mode of quench, most uniform hardenability will result by so regulating conditions as to obtain the most drastic quench possible from the particular medium employed, involving agitation and correctly directed flushing. Such uniformity is absolutely necessary in the quenching of most light sections to avoid such ills as breakage, warpage and nonuniform hardening.

Substantiating Mr. Luerssen's findings on the effect of preliminary treatments on the depth of hardening, M. W. Dalrymple, Bethlehem Steel Co., Bethlehem, Pa., cited the following measurements of depth of chill observed on ¾-inch round carbon tool steel cylinders, hardened in brine from 1450 degrees Fahr.:

Type of Steel	Previous Structure	Penetration of Chill, 64ths of an inch
Hypereutectoid, 1.00 per cent carbon	Spheroidized	12
Hypereutectoid, 1.00 per cent carbon	Sorbitic	10
Hypoeutectoid, 0.80 per cent carbon	Spheroidized	9
Hypoeutectoid, 0.80 per cent carbon	Sorbitic	10

Pointing to the desirability of either standardizing the diameter of the hardenability test specimens or correcting all such tests in terms of some standard surface, Mr. Dalrymple stated that it is a matter of considerable difficulty to maintain facilities for all the various methods of hardenability testing now in vogue. A standardization would be beneficial both from the standpoint of expense and ease of comparison of results.

■ A SERIES of transverse hardness tests for carbon, chromium-nickel, and chromium-molybdenum steels quenched and drawn at several temperatures was presented by Gordon T. Williams, chief metallurgist, Cleveland Tractor Co., Cleveland. The effects of time-quenching and of section size in tempering were reviewed.

Age hardening effects were found in the steels tested, when a mild quench was followed by reheating between 350 and 900 degrees Fahr.

It was found also that carburizing had a damaging effect on core hardness, noncarburized steels hardening to higher core values.

Importance of hardenability data on alloy steels as presented in Mr. Williams' paper was alluded to by W. E. Jominy, research laboratories division, General Motors Corp., Detroit, who pointed out that in many highly stressed parts the stresses, while highest at the surface, are still unusually high well below the surface; for such parts alloy steels are commonly used and hardenability data are essential. Observing the relatively large difference in hardening characteristics between S.A.E. 4140 and 4150 steels, Mr. Jominy cited as his experience that hardenability is not predictable with accuracy on the basis of chemical composition as ordinarily reported, and the grain size.

■ THEORETICAL side of the relative effects of small aluminum and silicon additions on the response to heat treating of commercial carbon steels of the medium carbon type, was reported by M. J. R. Morris, chief metallurgical engineer, Republic Steel Co., Massillon, O., and H. W. McQuaid, assistant chief metallurgist, Republic Steel Corp., Cleveland.

One object of the investigation was to check the relative effect of the commercial aluminum and silicon addition in the presence of manganese close to 1 per cent. So much has been claimed for the physical effect of the size of the grain on hardenability that little attention is given to other factors affecting hardenability over which no control is had and of which little is known. Those faced with the necessity for getting uniform results in the commercial processing of heat treated parts of all sizes know that the physical size of the austenitic grain is not the whole story.

As the requirements of the steel user for more uniform and better properties grow, variations which are independent of grain size, especially in alloy steels, are found. The grain size specification is an extremely important part of the steel specification and the carburizing test as usually applied offers a means for establishing this characteristic of a heat of steel at an early stage.

The steels which are known as the "fine grain" type have characteristics of shallower hardening which have made their development an important step forward. To what primary cause these properties are due is still unknown and whether they can be duplicated by other means is also not known.

The results of the hardenability tests indicate that a coarse grain heat of very low silicon may not have as high a hardenability as a higher silicon heat of the fine grain type. In view of the small percentage of silicon involved it is hardly possible that the effect is due to alloying action on the austenite.

In the authors' opinion, the effect of the silicon (and the aluminum) is primarily on the carbon, either directly on the carbide or through affecting carbon solution in the boundaries. It is noticeable that silicon tends to increase the fineness of the boundary carbide in hypereuctectoid steel.

One of the effects of low silicon is to increase the oxygen content in steel especially in the absence of aluminum. This would mean that some of the effects attributed to low silicon may be due to oxygen.

■ HARDENABILITY and its relation to quenching was analyzed mathematically by M. A. Grossmann, director of research, M. Asimow, metallurgist, Gary Works, and S. F. Urban, metallurgist, South Works, Carnegie-Illinois Steel Corp., Chicago. They pointed out that since the hardness distribution in a quenched bar depends both on the hardenability of the steel and on the severity of the quench, it is necessary in any quantitative treatment to distinguish between the two effects. The value of hardenability tests is not by any means restricted to the hardness distribution obtained, but may be made to reveal, in numerical values, the severity of the quench that was employed.

Mathematical analysis was used to discover a probable pattern of behavior, when using different quenches with steels of various hardenabilities, and the method selected gave values which accorded closely with values found in quenched bars.

By mathematical analysis it is possible to judge the true hardenability of the heated steel, which is independent of the severity of the quench. It also becomes possible to compare the results obtained by different laboratories, because the results reveal the severity of the quench employed in each case, as well as the hardenability.

Further, one may predict the hardness distribution which will be obtained in any size of quenched bar, once the hardness distribution in one appropriate size is known, and the severity of the quench known.

Quantitative data were derived for

(*Please turn to Page* 73)

Advertisement

COPPER ALLOY BULLETIN

Reporting News and Technical Developments of Copper and Copper-Base Alloys

NOVEMBER "Bridgeport" BRASS CO. 1938

EYE APPEAL IS ENHANCED BY BRASS ESCUTCHEONS

Manufacturers of automobiles, refrigerators, stoves, and radios are making extensive use of brass and bronze escutcheons and name plates to increase the merchandising appeal of their products. The natural attractiveness of the copper alloys and the ease with which they can be polished, plated, or enameled are factors that aid in enhancing the appeal of the merchandise to the eyes of prospective purchasers.

Fox Company, 3400 Beekman Street, Cincinnati, Ohio, manufactures large quantities of these decorative name plates from both brass and bronze and finishes them in gleaming chromium plate or in colorful enamels. Typical of the company's products is the Frigidaire name plate shown in the illustration, which is made of brass and inlaid with enamels.

Corrosion Studies Reported

A recently issued report of Committee B-3 of the American Society for Testing Materials summarizes in tabular form the result of studies on atmospheric corrosion of 24 non-ferrous metals and alloys after six years' exposure in 9 test locations. Results of the change-in-weight tests are not yet conclusive, as many of the test samples still show gains in weight.

A number of interesting comparisons were developed by the studies of changes in tensile strength. In industrial and sea-coast locations zinc, tin, aluminum and aluminum alloys, 70-30 brass, and manganese bronze showed substantial losses in tensile strength. The last two alloys named were the only ones among the various copper alloys tested to show this effect. Copper and the other copper alloys displayed only negligible losses in tensile strength, and similar results were obtained in the case of nickel and high nickel-copper alloys. In rural locations no appreciable loss in tensile strength was noted except in the case of tin.

The data indicate that industrial corrosive conditions are most severe in New York City, and that sea-coast corrosion is most marked at La Jolla, Calif.

QUALITY IS OF FIRST IMPORTANCE IN BRASS SCREW AND RIVET WIRE

Cold heading is probably the most severe operation that metal must undergo in the fabrication of bolts, screws, rivets, and headed products. A coil of wire is fed into a heading machine that straightens it, cuts it off to the precise length, and holds it tightly while it is struck one or more powerful blows, causing one end to swell and fill the inside of the die. Most materials shatter under such impact, but the stiff, hard brass seems to flow like putty to fill the die.

From the mill processing angle the making of brass screw or rivet wire is a fussy job. The alloy must be ductile enough to stand heading without developing internal shearing strains. If the wire is too soft, the shank of the screw or rivet lacks stiffness. A soft wire also may flatten during straightening, and may not shear cleanly and squarely, thus producing lopsided heads.

Since most of the stretching takes place across the grain, the surface will naturally open up, and every scratch or blemish will be enlarged. Moreover, if the grain structure is too coarse, the head becomes rough and pitted and may even crack. The microstructure of the wire is, therefore, of extreme importance, especially when large heads or intricate shapes must be produced.

Each heading job, therefore, requires the right alloy, correct stiffness, proper grain structure, freedom from minute imperfections and uniformity—conditions attained only by close cooperation between laboratory and mill.

From the fabricator's standpoint, the heading process is probably the most economical way of making strong, precise, intricate articles at high speed with little waste. The need of costly equipment limits the method to quantity production.

Manufacturers of screws and rivets will find marked advantages in the use of Bridgeport wire, particularly for large heads, difficult shapes, or items that must meet special engineering requirements. Bridgeport wire will bring profit to many jobs that are now considered "headaches."

PREPARED EACH MONTH BY THE BRIDGEPORT BRASS COMPANY
Headquarters for Brass, Bronze and Copper

COPPER ALLOY BULLETIN

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. Further information on any of these items may be obtained by writing the Bridgeport Brass Company, who will gladly refer readers to the manufacturer or other source.

A soldering flux for brass, bronze, and copper, is said to be primarily intended to meet the needs of fast soldering on a mass-production basis.

Cable connectors for a wide range of cable sizes use flattened U-bolts for clamping. They are available in many forms, including angle lugs, T-connectors, elbows, and stud clamps.

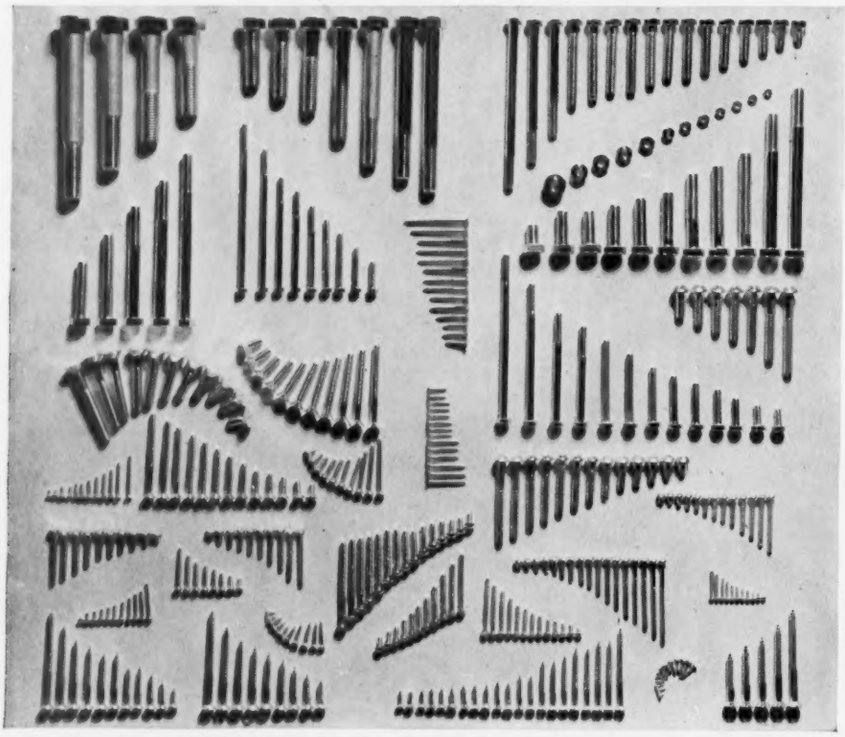
An analytical set for use by electroplaters contains the necessary equipment for determining the pH of solutions. Set includes nine color standards, graduated test tubes and pipette, indicator solution, and brush.

A band saw is reported to be especially suitable for metal working shops using many different kinds of metal. Its speed is variable from 150 to 450 feet per minute.

Portable grinders are available in two sizes with wheel capacities of 2 and 2½ ins. They are precision tools with a no-load speed of 19,000 RPM. Weights for the two sizes are said to be only 3½ and 4½ pounds. Units are balanced for easy handling.

Universal valve disks are built up of alternate layers of asbestos and metal completely encased in a two-piece shell of copper or other metals. They are for use in globe valves, and are said to be suitable for handling air, gas, steam, acids, alkalis, and solvents.

LARGE STOCKS OF DURONZE SCREWS CARRIED BY ROCKFORD



Good News! Duronze Cap Screws ranging from 6″ x ¾″ to ½″ x ¼″ with nuts to fit, and Round and Flat Head Machine and Wood Screws in many lengths and sizes are now carried in stock by Rockford Screw Products Co., Rockford, Ill. This takes care of orders for trial and experimental quantities without the penalties of delay or "made to order" prices. On the smaller sizes, Duronze screws have a tensile strength averaging over 100,000 lbs. per square inch. They resist corrosion and season cracking better than screws made of common alloys.

BRASS TERMINOLOGY

This is the eighteenth of a series on the nomenclature peculiar to the industry specializing in the making of brass, bronze and copper alloys.

The type of finish specified on copper and copper alloys has an important bearing both on the cost of the material and on the attractiveness of its appearance. The selection of one or another of the various finishes depends on the relative importance of these two factors. In the following discussion the finishes are arranged in order of increasing cost, the least expensive being named first.

Machine finish leaves the metal in the state in which it comes from the last machining operation, without any cleaning or dipping.

Clean finish is obtained by washing to remove dirt and grease; stains are not removed.

Bichromate dip removes stains and brightens the metal.

Bright dip, obtained by an acid bath, gives a much brighter finish than bichromate dip. It removes stains and scale, and is frequently specified when soldering operations are necessary. It is not recommended if close tolerances are needed.

More Expensive Finishes

Polish is the most expensive type of finish applied to the original metal. It involves preliminary grinding with emery powder, buffing with tripoli, and coloring with rouge or similar material. Polished metals are usually lacquered to prevent marring the surface.

Plating involves the application of a coating of another metal to the base metal. As in the case of the base metal, different grades of plated finish exist. **Dull nickel plate** and **dull chrome plate** are obtained by acid dipping and then plating. These finishes are sometimes designated as **dip nickel** and **dip chrome.**

Buffed nickel and **buffed chrome** are brighter finishes obtained by buffing the metal prior to the plating operation. This type of finish is always used when the plate is subsequently to be buffed and polished. In this case the final finish is known as **polished nickel** or **polished chrome.**

Satin or Butler finish is obtained by dulling the highly polished plated surface by scratch brushing. This type of finish is used when a soft sheen is more desirable than a high degree of gloss.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers; oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

BRASS "Bridgeport" CO.

Established 1865

COPPER WATER TUBE AND FITTINGS—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

*Trade-name.

BRIDGEPORT BRASS

Mechanical Engineers Scheduling Many Sessions for Annual Meeting

■ AN EXTENSIVE program of technical sessions, luncheons and dinners has been arranged for the fifty-ninth annual meeting of the American Society of Mechanical Engineers in New York, Dec. 5-9. Sessions to be held at the Engineering Societies building will be devoted to the latest developments in machine shop practice, metals, fuels, lubrication, instruments, ordnance, research, management and safety. The annual dinner will be served at Hotel Astor on Dec. 7.

Sessions of interest to the iron, steel and metalworking industries are scheduled as follows:

Monday, Dec. 5

MORNING

Meetings of council, sections delegates and professional divisions delegates.

AFTERNOON

Business meeting.

EVENING

Machine Shop Practice

"Modern Hydraulic Units for Machine Tools," by K. R. Herman.
"Application of Hydraulics to Machine Tools," by Paul Jackson.

Tuesday, Dec. 6

MORNING

Pipe Stress Problems

"Determination of Expansion Forces in Piping by Model Tests," by H. W. Semar.
Progress report on creep tests of tubular members.
Progress report on relaxation tests.

Job Evaluation

"Job Evaluation," by J. E. Walters.
"A Specific Application of Job Evaluation," by A. W. Bass Jr.

Iron and Steel

"Hard Surfacing Processes and Materials," by M. L. Begeman.
"Some Observations on Yield Point of Low Carbon Steel," by Joseph Winlock and R. W. E. Leiter.

AFTERNOON

Power-Fuels

"Modern Boiler Furnaces," by E. G. Bailey.
Report of boiler feedwater studies committee, by C. H. Fellows.

Machine Shop Practice

"Effects of Size and Shape of Cut Upon Performance of Cutting Fluids when Turning S.A.E. 3140 Steel," by O. W. Boston, W. W. Gilbert and L. V. Colwell.
"Electric Pressure Gage," by S. B. Terry and C. M. Hathaway.

Industrial Instruments

"Quantitative Analysis of Single-Capacity Processes," by A. F. Spitzglass.
"Operating Experience and Graphical Analysis of Automatic Combustion Control," by P. W. Keppler.

Elasticity—Applied Problems and Mechanical Springs

"Stresses in Helical Compression Springs, Present Status of the Problem," by C. T. Edgerton.
"Analysis of Effect of Wire Curvature on Allowable Stresses in Helical Springs," by A. M. Wahl.
"A Method of Calculating Energy Losses During Impact," by C. Zaener and H. Feshbach.

Organization

"Untangling the Corporate Harness," by Marvin Bower.
"Organization Designed for Modern Business Conditions," by F. E. Raymond.

Wednesday, Dec. 7

MORNING

Metal Forming Processes

"Effect of Speed of Stretching and Rate of Loading Upon Yielding of Mild Steel," by E. A. Davis.
"Tension Devices in Rolling Strip," by Morris Stone.
"Forces Required for Rolling Strip Under Tension," by A. Nadai.

AFTERNOON

Elasticity—Applied Problems and Mechanical Springs

"Deflection of Helical Springs Under Transverse Loadings," by W. E. Burdick, F. S. Chaplin and W. L. Sheppard.
"Strength of Metals, with Special Reference to Spring Materials," by D. J. McAdam Jr. and R. W. Clyne.
Research report on helical springs, by C. T. Edgerton.

Lubrication

"Thin Oil Films," by Walter Claypoole.
"Wear in Lubrication Problems," by L. M. Tichvinsky.

EVENING

Annual dinner at Hotel Astor.

Thursday, Dec. 8

MORNING

Safety

"Control of Dust Explosions in Industrial Plants," by Hylton R. Brown.
"Factory Layout and Safety," by F. J. Van Poppelen.

Railroad

"Counterbalancing of Reciprocating Weights in Steam Locomotives," by A. I. Lipetz.
"Electric Locomotives," by B. S. Cain.

AFTERNOON

Education and Training

"Cost of Apprenticeship," by Warner Seely.
"Industrial Training in the Air Conditioning Industry," by Ray D. Smith.

High Temperature Problems

"High-Temperature Steam Experience at Detroit," by R. M. VanDuzer Jr., and Arthur McCutchan.
"Changes in a High-Pressure Drum to Eliminate Recurrence of Cracks Due to Corrosion Fatigue," by A. E. White.

Railroad

"Motive Power Characteristics and Light-Weight Equipment," by R. Eksergian.
Annual report of progress in railway mechanical engineering, by E. G. Young.

Applied Mechanics and Ordnance

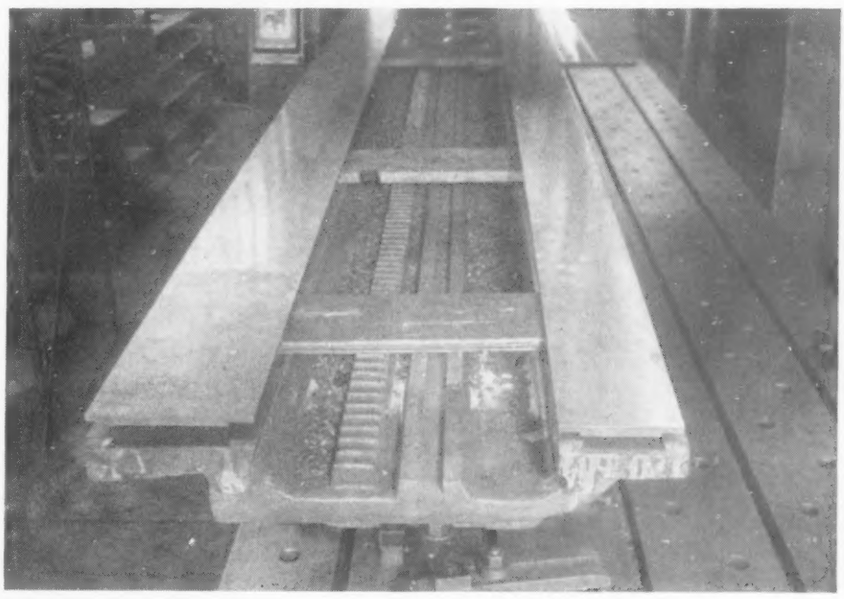
"Ordnance and Vibration Problems," by G. F. Jenks.
"Methods of Rotor Unbalance Determination," by J. G. Baker.
"Critical Speed Behavior of Unsymmetrical Shafts," by H. D. Taylor.

♦

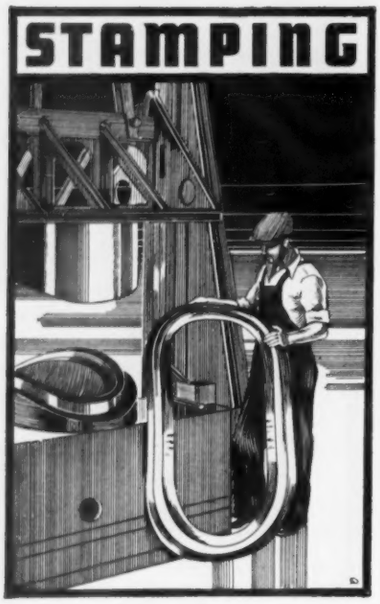
Flux Is Non-Corrosive

■ Developed by Ohio Carbon Co., Cleveland, for use on difficult soldering operations in its own plant, a new noncorrosive soldering flux is said to double speed of production. Flux was created for fast soldering of brass, tin and copper on a mass production basis.

Uses Laminated Lathe Bed Ways



■ **International Machine Tool Co., Indianapolis, employs oil hardening, 1.00 per cent carbon strips $\frac{1}{8}$ to $\frac{3}{16}$-inch thick, rolled with a low carbon backing plate and dovetailed to fit into beds of heavy-duty turret lathes. Strips test 550 brinnel, are press fit assembled to lathe bed using from 6 to 16 tons pressure. Strips are 8 inches wide, 124$\frac{1}{2}$ inches long. Also made up to 8 feet longer in multiples of 1 foot. Surface is finish ground after assembly on bed**



Combination Stamping

Setup combines stamping, forming and nut-enclosing in one continuous series of high speed operations. Employs unusual arrangement of progressive dies with a dial feed mechanism

By F. A. CALDEN
E. W. Bliss Co.
Brooklyn, N. Y.

■ MANY interesting and unusual designs of presses, dies and feeds have recently been developed to accommodate new products; to produce more economically standard articles now being made and also to perform combinations of operations which have never before been attempted.

In many instances, these sequences of operations have been developed using a press fitted with automatic feeds and follow dies. Now, we are going a step further and automatically assembling a separate part with another which is being formed in the same press. To obtain successful operation of a machine handling these various functions, extreme accuracy in design of tools and feeds and perfect synchronization of combinations of feeds are required.

One problem was to enclose in metal a small square machine nut used in automobile-body construction; the nut measuring ⅜ x ⅜-inch with ⅛-inch hole. The metal in which this nut is enclosed is deep drawing, cold-rolled steel stock in a coil 0.025-inch thick and 1⅜ inches wide. The top and bottom views of the enclosed nut are shown in Fig. 4.

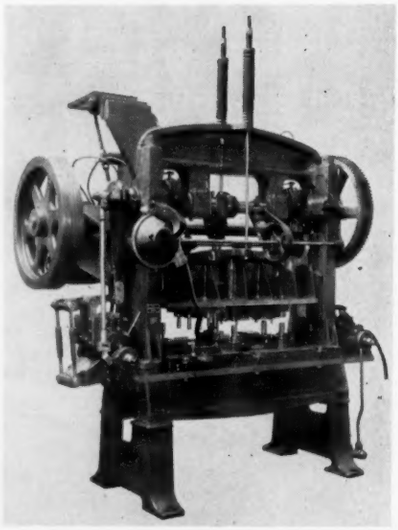


Fig. 2—Press with dial feed and vertical oscillating nut hopper with finger feed

Nuts, which are not made in this machine, are fed one at a time through a hopper to a dial feed which can be seen in Fig. 3 just left of the center pilot pin on the die shoe. This problem and its solution are typical of multiple combination stamping and forming work.

Nineteen operations are required to form the enclosing metal shell and set down the tabs, completing the operation. Five of these operations are performed in a dial feed operating synchronously with the multistation die. Fig. 5 illustrates the upper and lower sides of the strip showing the various operations up to the point where the steel enclosure is pinched off the strip, prior to the next operation of being fed into the first operation of the dial feed.

Sequence of operations shown in the Fig. 5, are as follows: Punch, pilot, punch between blanks, draw, hold, redraw, redraw, form flat side, push out bottom, burr down, stamp letting, trim, draw square, shear out and punch through, form tabs, and deliver to dial pocket.

At this stage of the operation, a

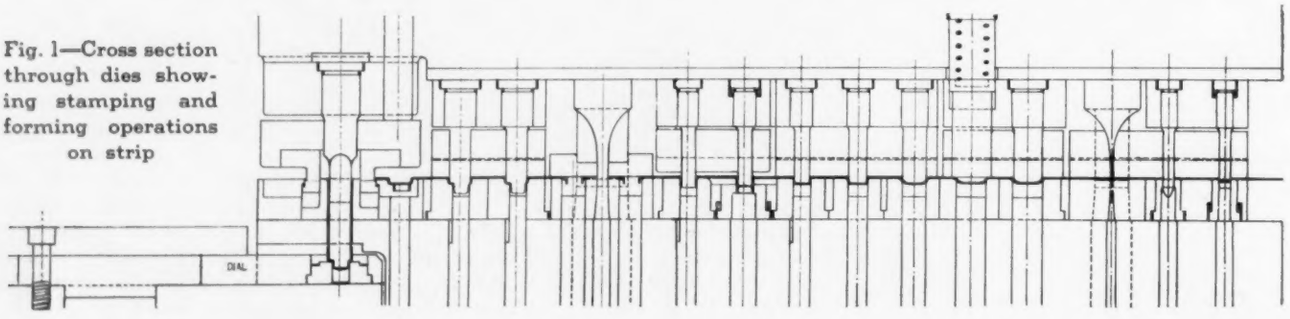
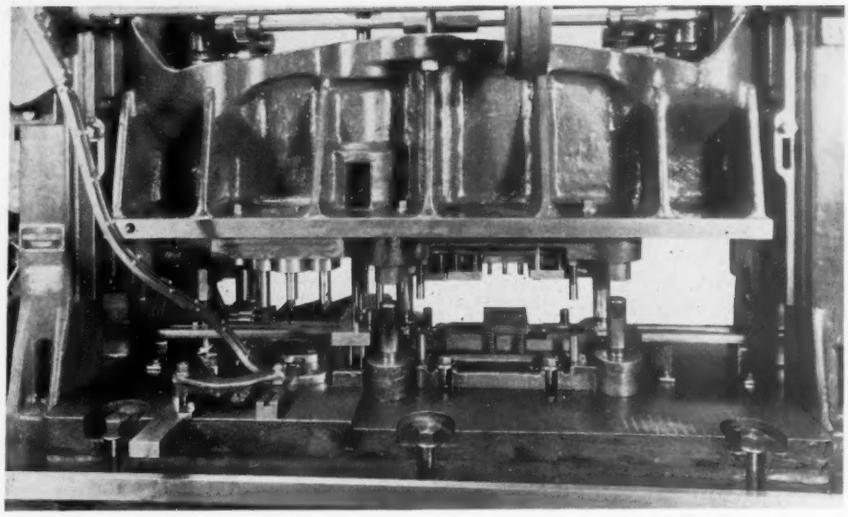


Fig. 1—Cross section through dies showing stamping and forming operations on strip



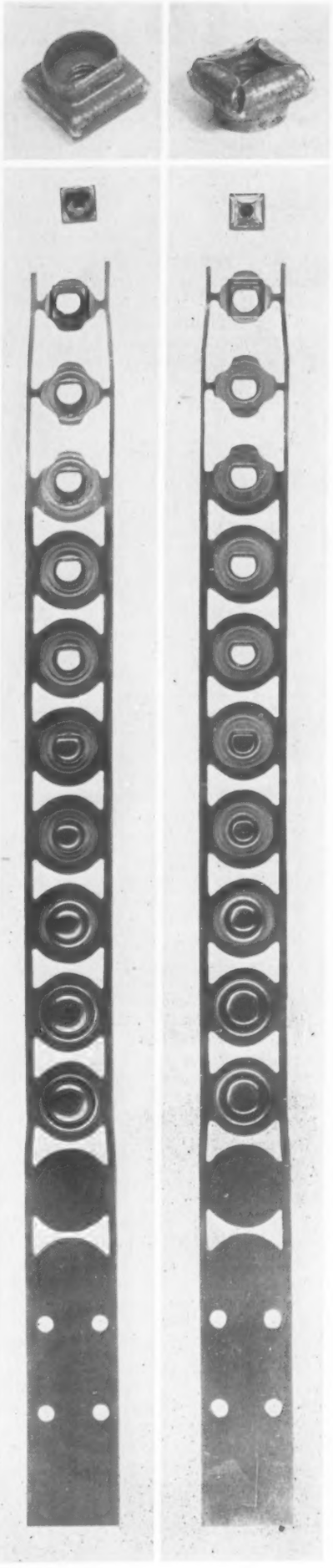


Fig. 3. (Upper left)—Multiple stamping and forming dies used in this work. Fig. 4. (Upper right)—Top and bottom views of nut completely enclosed

nut drops down the feed chute from the hopper. It is grasped in a feed finger and dropped into the preformed blank. This operation takes place synchronously with the next five operations, which occur in the dial feed as follows: Flange opening station, assemble (this operation is synchronous with the last, or shear out and punch through, operation in the follow die), 1st flange closing action, 2nd flange closing action, final flange closing operation and ejection. The dial feed stations are shown in Fig. 6.

Fig. 2 illustrates a machine designed for this particular work. A straight sided, double crank press was utilized, giving sufficient space from left to right between housings to accommodate die and feeds.

To secure a smooth steady operating condition, a single back-geared type machine was decided on, the slide being counterbalanced by two cylindrical springs. The press was individually driven through V-belts to the flywheel on the back shaft. A friction type manually operated clutch afforded smooth easy control; the tie rod type frame was fitted with wedge backed, bronze lined gibs to insure an accurate alignment of the slide. A double roll feed, scrap cutter, hopper, dial and push feed also were furnished. Both the slide and the bed were fitted with cam actuated knockouts.

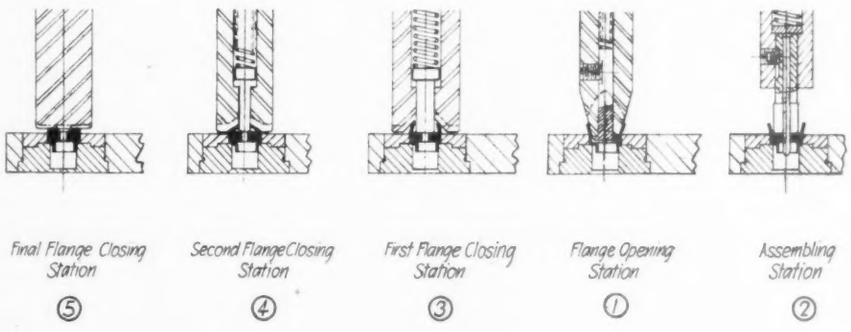
Ratchet dial feed at side of the press has a pickoff attachment. Mounted on one side member is a hinge type vertical oscillating hopper with a finger feed to deliver nut blanks from the hopper to the feed dial. The hopper is driven by means of a flat belt running off the crankshaft of the press to a jack shaft at the front of the press.

The double roll feed is arranged to handle coil strip of cold rolled deep drawing steel from right to left through the openings of the side member. An end of the strip stock can be seen hanging from the roll feed at the right hand end of the press. This strip of stock first passes through the roll feed, guide rolls and stock oiler to the first station in the die. Fig. 3 shows the die setup looking from the front of the press. These operations are performed at a speed of 60 finished pieces per minute.

In the manufacture of a great

(*Please turn to Page* 73)

Fig. 5. (Right)—Upper and lower sides of strip showing progressive operations. Fig. 6. (Below)—Operations at dial feed stations where strip is formed around nut



Purdue Foundry Meeting Surveys Recent Progress

■ RECENT progress made in the manufacture of steel, malleable and gray iron castings was reviewed at the regional foundry conference at Purdue university, West Lafayette, Ind., Oct. 27-29. The meeting, arranged under joint auspices of the Chicago chapter of the American Foundrymen's association and the university, was attended by 225 foundrymen from Indiana, Illinois and neighboring districts.

Welcoming the conferees to the university, A. A. Potter, dean of engineering, paid tribute to the foundry industry for progress in recent years and stressed the importance of research as insurance for tomorrow.

Many phases in production of steel castings were discussed in papers at two steel sessions. H. A. Forsberg, Continental Roll & Steel Foundry Co., East Chicago, Ind., spoke of manufacture and application of steel castings; F. B. Skeates, Link-Belt Co., Chicago, on operation of the converter; Al. Gierach, American Manganese Steel Co., Chicago Heights, Ill., on the electric furnace; John W. Porter, American Steel Foundries, Chicago, on the open-hearth furnace; C. W. Briggs, Steel Founders' Society of America, Cleveland, on castings design; and F. A. Melmoth, Detroit Steel Castings Co., Detroit, on properties of steel castings.

Discusses Railroad Castings

In an extensive reference to the railroad field, Mr. Forsberg stated that at present about 35 per cent of the weight of the modern locomotive is steel castings, and between 16 and 18 per cent of the modern freight car comprises steel castings. Principles of correct design have been fairly well standardized. Sharp internal corners should be avoided and abrupt changes in sectional thickness must be eliminated. Heavy bosses and chunky sections in isolated spots should not be incorporated in the design. The speaker supplemented the paper with illustrations of a wide variety of steel castings ranging in weight from ounces up to 250 tons.

Intimate and detailed description of the three principal steelmaking processes were presented in three of the papers. Following a brief historical introduction, Mr. Skeates described an installation of two Zenze type side-blown converters with two cupolas and other auxiliary equipment. The cupola charge is made up of 300 pounds of low phosphorus pig iron, 1000 pounds return scrap, 900 pounds steel scrap and 100 pounds of 50 per cent ferrosilicon. Metal from the cupola is desulphurized with 50 pounds flake caustic soda and 10 pounds of lime.

Essential features of converter operation include: Hot iron with silicon content between 1.75 and 2.10 per cent; manganese in cupola metal about 0.50 per cent; converter lining held to size; and accurate weighing of materials. According to the speaker, if these essentials are observed, the operator should have no difficulty in meeting any reasonable chemical or physical specifications.

Furnace Construction Outlined

The paper of Mr. Porter was devoted principally to the construction and method of operating the open hearth furnaces at his company's Granite City, Ill., plant and covered: Building the furnace bottom; tap hole, runners, charging, draft, oil fuel, steam, slag, refining, preliminary tests, furnace additions, finishing and tapping the heat, ladle additions, repairing furnace bottom. He claimed that by the use of a uniform charge from heat to heat and by the control of refining operations, it is possible to produce the highest grade of steel consistently.

In his contribution on fundamentals of design, Mr. Briggs pointed out that the subject of steel casting design is considered from two view points, that of the designing engineer and that of the foundryman. A code or the nucleus of a set of rules was presented for the engineer's guidance. Experimental results on padding, external and internal chills, and controlled directional solidification were described and illustrated. Models of the original design are helpful.

After the foundryman has obtained a workable design he can use the tools at his command, tapered sections, proper gates and heads, chills, relieving blocks, etc., to prevent shrinkage cavities and hot tears. These foundry arts, the speaker claimed, have been used to advantage on poorly designed castings, but they cannot be expected to cure all the evils found in designs produced with little or no thought of foundry problems.

Discussing properties of steel castings, Mr. Melmoth claimed that the industry as a whole has not publicized its technical advancement to the extent achieved by the producers of worked steels. The fact that the latter are subjected to mechanical work of a structure modifying type always has been advanced as one reason for superiority.

In the absence of such work, steel castings respond remarkably to various forms of heat treatment and manifest physical properties over a wide range and of a standard equal in many cases to those commonly specified for worked steels. He explained that his remarks were designed to illustrate by a series of steels of different analyses, subject to a schedule of commercially used heat treatments, the ready response of cast steels to thermal treatment. A series of physical tests both static and dynamic were shown to illustrate these effects and photomicrographs presented with a view to the explanation of the physical results achieved.

One of two malleable cast iron sessions was devoted to annealing practices. L. E. Roby Jr., Peoria Malleable Iron Co., Peoria, Ill., described conventional annealing practices applied in his foundry. Castings are annealed in batch-type ovens fired by hand and by powdered coal, with capacities of approximately 25 tons. With the hand-fired oven, and a coal cost of $4.08 per ton, the coal cost per ton of castings annealed is $2.24. With pulverized coal firing and a coal cost of $3.58 per ton, the coal cost per ton of castings annealed is slightly over $1.07. With the ovens, a 7-day cycle is employed.

Approximately 40 hours are required to bring the furnace to 1600 degrees Fahr., and the castings are held for 44 hours at that temperature. Then the castings are cooled to 1400 degrees Fahr. which requires about 18 hours. Slow cooling through the critical range down to 1150 degrees Fahr. requires 42 hours.

Controls Furnace Atmosphere

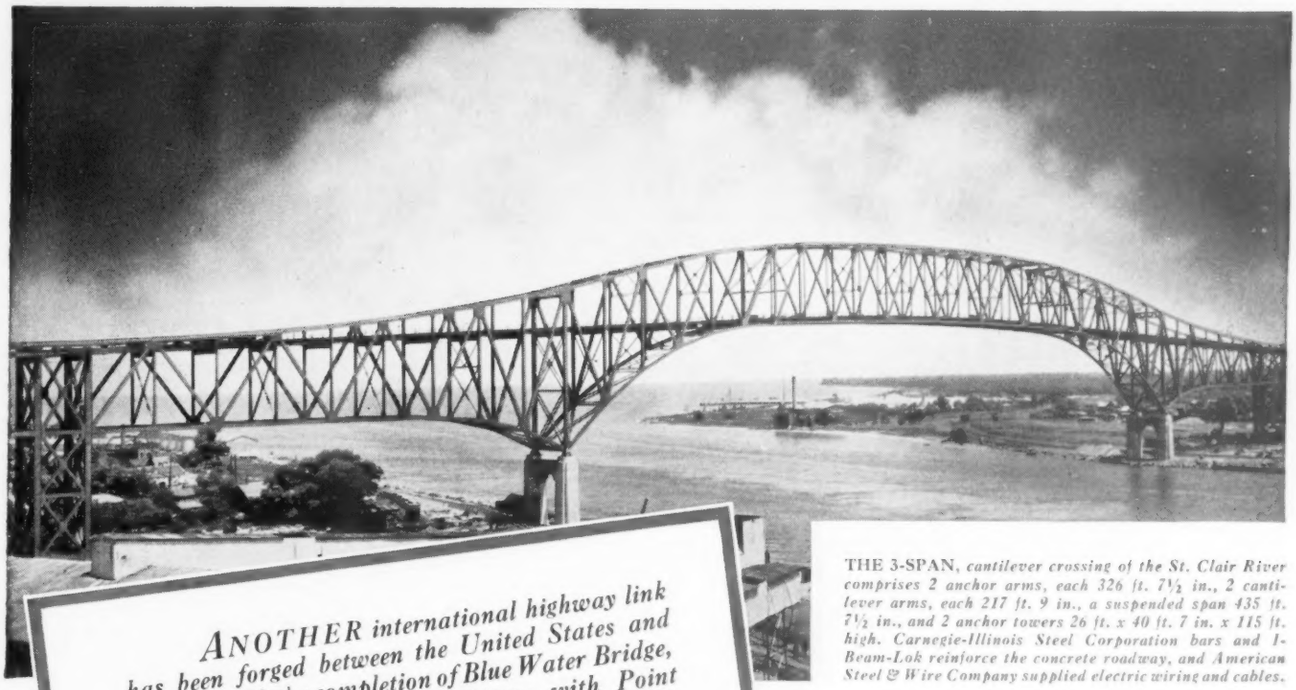
C. C. Lawson, Wagner Malleable Iron Co., Decatur, Ill., described the application of controlled atmospheres to annealing malleable. The type of furnace discussed is an intermittent or batch type, radiant tube furnace. Controlled atmosphere supplied to the furnace is generated in a special unit, and is supplied to the furnace under a pressure of 1 to 2 ounces to exclude air infiltration. Approximately 9 hours are required to bring the furnace up to 1725 degrees Fahr. at which the castings are held for 23 hours.

Then by blowing cold air through the tubes, the castings are cooled to 1400 degrees Fahr. in 2½ hours.

(*Please turn to Page* 74)

Impressive River-Crossing

OF THE BLUE WATER BRIDGE

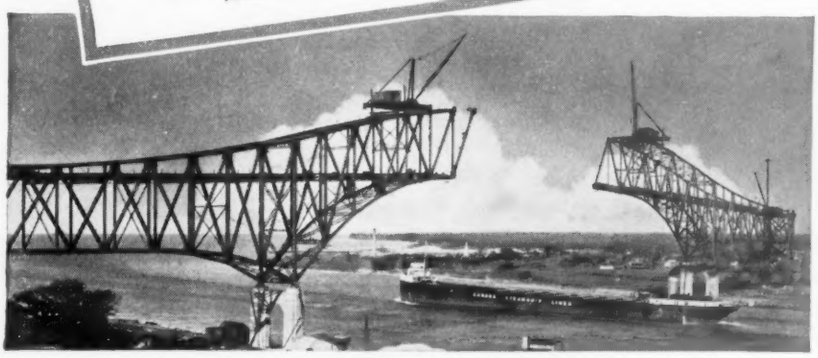


ANOTHER international highway link has been forged between the United States and Canada with the completion of Blue Water Bridge, connecting Port Huron, Michigan, with Point Edward, Ontario. The entire structure is of steel, 1¼ miles long, and consists of three sections: the dominating St. Clair River crossing, flanked by American and Canadian viaduct approaches, respectively 2301 and 2657 feet in length.

•

Modjeski and Masters, Harrisburg, Pa., Consulting Engineers; Monsarrat and Pratley, Montreal, Canadian associates.

THE 3-SPAN, *cantilever crossing of the St. Clair River comprises 2 anchor arms, each 326 ft. 7½ in., 2 cantilever arms, each 217 ft. 9 in., a suspended span 435 ft. 7½ in., and 2 anchor towers 26 ft. x 40 ft. 7 in. x 115 ft. high. Carnegie-Illinois Steel Corporation bars and I-Beam-Lok reinforce the concrete roadway, and American Steel & Wire Company supplied electric wiring and cables.*



THE RIVER SPAN, including the 2 cantilever arms and the suspended span, was erected as cantilevers from the river piers without the use of falsework.

SIGNIFICANT of American Bridge Company's participation in this notable achievement is the impressive river crossing which included the ready-for-traffic superstructure under contract. Impressive, too, the pleasing lines which simulate the arch.

This 3-span, cantilever structure has a total length of 1576 feet, 4½ inches. It carries a 32-foot roadway and a 4-foot sidewalk, 150 feet above the water level of one of the world's most important waterways.

American Bridge Company fabricated and erected all the structural steel entering into this construction — approximately 4750 tons, of which some 2000 tons are of high strength silicon steel.

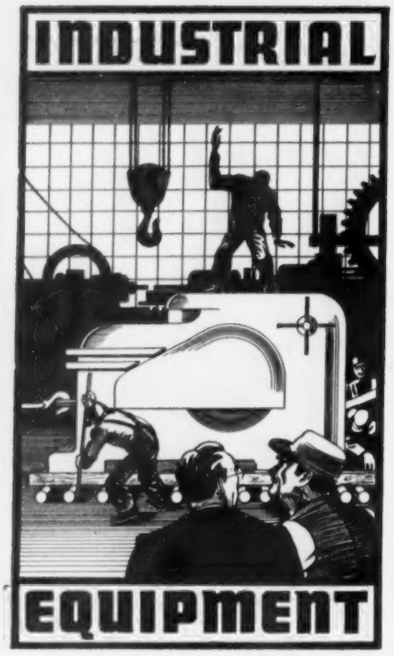
AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



Aluminum Case Protects Electrostatic Voltmeter

■ General Electric Co., Schenectady, N. Y., has introduced a sturdy and accurate portable electrostatic voltmeter for measurements of alternating or direct current voltage on systems where one line is grounded.

Available in ratings of 3, 5, 10, 15 and 20 kilovolts, instrument is designed for fast response and ability to hold its calibration. Further features include light-beam pointer, magnetic damping and a specially designed high-voltage terminal with a current-limiting resistor for increased safety. Typical applications are: Measurement of applied voltage in dielectric tests; study of electrostatic phenomena such as generation of charges by moving belts or other objects; determination of peak voltage by the vacuum-tube method; and measurement of exceptionally high voltages when used in conjunction with a voltage divider.

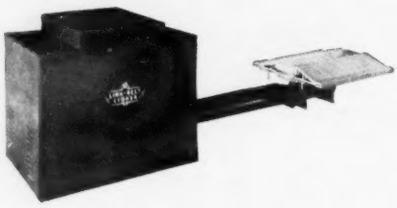
Instruments are shipped completely assembled and calibrated. Calibration is not disturbed when the unit is moved from one location to another. To place instrument in operation, it is necessary only to ground the case, energize the light source and make the high-voltage connections. Effective shielding against stray electrostatic fields is provided by the grounded aluminum case.

Commercial Stoker Burns Various Types of Coal

■ Link-Belt Co., 307 North Michigan avenue, Chicago, has placed on the market a new model commercial stoker designed to burn a wide variety of bituminous stoker coals and handle 3500 square feet of radiation.

Hopper is entirely enclosed; front compartment houses the fan, motor, transmission and automatic air control. Shear pin on the transmission is equipped with a "load-signal" which announces when pin shears, in case an obstruction should get into the feed tube.

Burning head is the "Power-Flex" type, which features laminiated tuyeres with primary and secondary

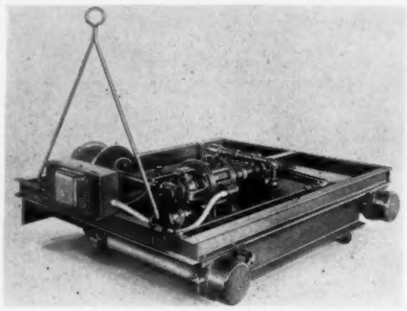


air ports. No dead plates are used. With this design, an active fuel bed is maintained over practically the whole area of the furnace, with consequent higher efficiency and capacity. The "Power-Flex" head will burn both low-fusion, non-caking bituminous coals and high-fusion, caking and coking coals. Flexibility to meet local boiler conditions is secured by the use of various length tuyeres.

Hydraulic Unit Packs Cargo in Railroad Cars

■ Denison Engineering Co., Columbus, O., has announced a new cargo packer developed to provide a practical means of tightly packing bricks and other small merchandise into box cars, thereby eliminating the frequent heavy loss incurred by the merchandise shifting in transit because of not being properly blocked.

Unit consists essentially of an electric motor, pressure pump and two hydraulic cylinders, mounted within a box-like structural steel frame. To make unit easily portable, as well as free-wheeling for proper transmission of pressure, entire equipment is mounted on heavy steel casters. Current for motor is supplied by a flexible cable which



connects to an ordinary electric outlet.

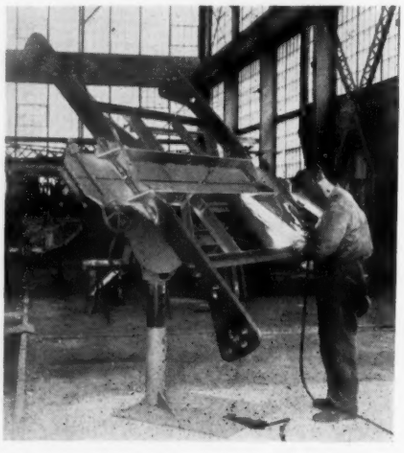
After machine has been placed between two piles of merchandise, balks are placed between rams of the two cylinders for even distribution of pressure and the electric motor is turned on. As hydraulic plunger goes into action the free-wheeling equipment quickly goes into position in order that pressure is evenly distributed at both ends of the car.

Welding Positioner Aids Handling of Structures

■ Cullen-Friestedt Co., 1308 South Kilbourn avenue, Chicago, has designed a welding positioner which allows operator to weld on all sides, top and bottom of a structure with a single setup.

Table can be tilted a total of 135 degrees from horizontal, so all welds can be made in a horizontal trough. It is revolved and tilted by means of a separate handwheel for each operation, and can be revolved through a full circle regardless of angular position. Gears are self-locking in all positions.

Base of the positioner measures 30 x 39 inches and rests flat on the floor, permitting operator to walk freely without interference. Height

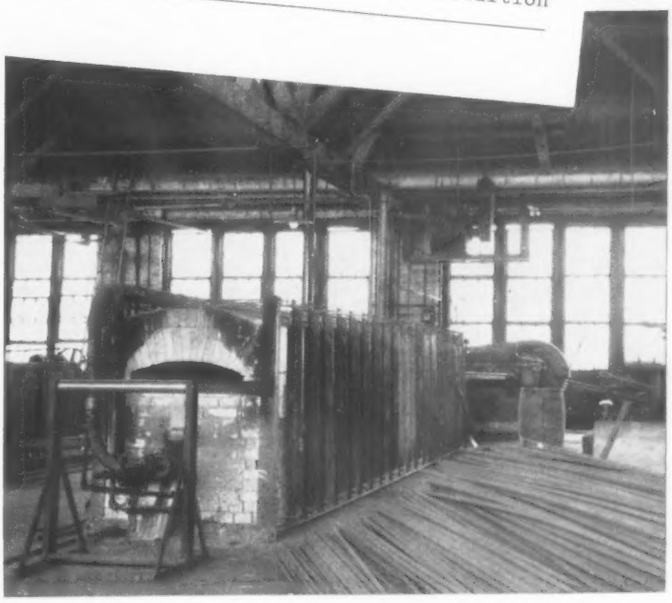


WHAT HAPPENS when you replace a fireclay hearth with "CARBOFRAX"

HERE'S WHAT HAPPENED IN A MIDWESTERN MALLEABLE IRON FOUNDRY

OPERATING RESULTS

	With Fireclay Hearth	With "Carbofrax" Hearth
Time required to bring furnace to operating temperature	6 hours	4 hours
Scaling in heating period	Considerable (due to longer time in furnace)	None
Production in 8 hr. period	9 tons	11 tons (22% increase)
Life of hearth	2 weeks	2 months (300% increase) Still in good condition



● This midwestern malleable iron company replaced a fireclay hearth with "Carbofrax" in a furnace used for heating bars for forging.

The foregoing report tells the whole story of the savings they have made.

Operation—Furnace operated at 1850°F. to heat low carbon bars 28 ft. x 7/8 in. x 3/4 in. to forging temperature for manufacture of rail anchors. Bars weigh 60 lbs. each. A furnace load is eight bars and as one is drawn a cold bar is charged. The hearth is 30 ft. long, 2 ft. 6 in. wide. With fireclay the floor was 4 in. thick. Because of its greater strength, even at high temperatures, a "Carbofrax" floor 2 in. thick carries the same load satisfactorily.

Naturally, they're enthusiastic about "Carbofrax" hearths. Similar savings can be made in YOUR heating and heat-treating operations by utilizing the high heat conductivity, the great strength and the resistance to cracking and abrasion of "Carbofrax" hearths.

Refractory representatives in the offices listed will be glad to make a survey for you.

REFRACTORY CARBORUNDUM REG. U.S. PAT. OFF. PRODUCTS

THE CARBORUNDUM COMPANY, REFRACTORY DIVISION, PERTH AMBOY, N. J.

REG. U. S. PAT. OFF.

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Agents: McConnell Sales and Engineering Corp., Birmingham, Ala.; Christy Fire Brick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas.

(Carborundum and Carbofrax are registered trade-marks of The Carborundum Company)

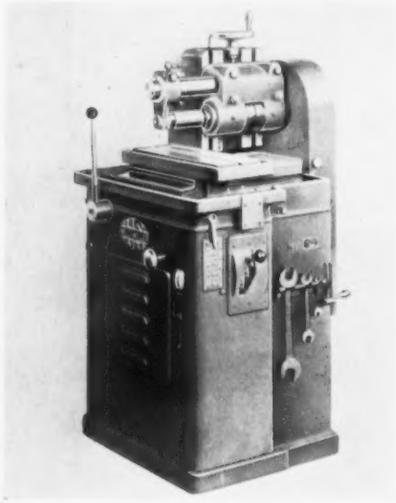
is adjustable from 36 to 48 inches. Unit is furnished with head on which can be bolted special tables or fixtures suitable for particular jobs. Its capacity is 2500 pounds with center of gravity of load 6 inches from the table.

Automatic Machine Built For Production Milling

■ U. S. Tool Co., Ampere, East Orange, N. J., has designed a new multi-miller, the MM-5, a compact, light automatic machine engineered especially for accurate production milling of small parts.

Rotary milling, contour milling, climb milling, continuous milling and every other application of the MM-1 machine can be handled with the new model. In addition table feed has been increased from 4 to 6 inches and the machine designed for a 1-horsepower spindle drive motor in place of the ½-horsepower motor.

Pliers, small arms, hardware and other fairly heavy parts can now be



milled economically on the multi-miller. A single operator attends as many as six of these units, depending upon the work milled. They are designed to be set close together to facilitate efficient loading and for economy of space.

Arc Lamp Performance Improved by Rectifier

■ Raytheon Mfg. Co., Waltham, Mass., has developed a portable rectifier to convert 115 volts alternating current to 60 volts, 5 amperes direct current to provide direct current of the proper characteristics for all makes of 6-millimeter carbon arc lamps.

Compactness and efficiency are said to result from use of the new Raytheon RX-207 tube to obtain rectification and a built-in current limiting transformer, which gives same operating results formerly obtained only with external ballast resistors. There are no adjustments. Rectifier

is simply plugged into a 115-volt alternating current supply and arc lamp is plugged into the direct current output receptacle.

Interferometer Makes Expansion Measurements

■ Gaertner Scientific Corp., 1201 Wrightwood avenue, Chicago, has devised an improved interferometer with which it is possible to obtain accuracies of 1/1,000,000-inch in measuring small displacements by utilizing interference of light waves.

This method is used for determination of thermal expansions of ceramic materials, vitreous enamels, glasses and metals at temperatures as high as 1000 degrees Cent. Measurements give, with great accuracy, the change in separation of two parallel quartz plates, as indicated by motion of interference fringes. To obtain sharp fringes the light beam must consist of parallel rays and fringes must be viewed along the axis of these rays. Illuminating and viewing apparatus of this instrument is designed to fulfill these conditions.

Viewing apparatus is mounted on a cast iron base which holds a small

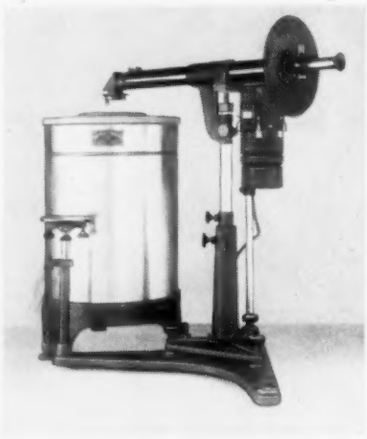
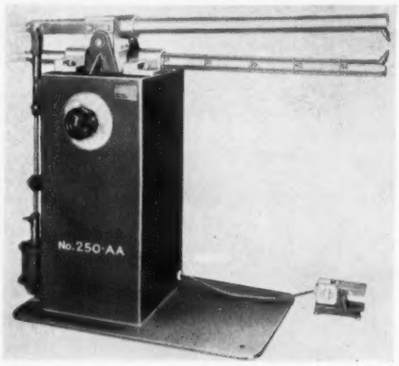


table for adjustment of interferometer and a mercury arc lamp with filters. Light is reflected by a stationary prism along the vertical axis of the viewing apparatus which may thus be rotated between different furnaces and the test table without discontinuity in illumination and without necessity for moving lamp. Furnace for thermal expansion interferometer has a cast iron base and a stainless steel shell with imbedded kanthal heating element and solid insulation. A convenient, portable indicating and control panel is supplied.

Has Long Horns for Deep Sheet Metal Work

■ Eisler Engineering Co., Newark, N. J., has placed on the market a universal long-horn spot welder for deep sheet metal work. Novel feature of the machine is that both horns can be lengthened or shortened to fit size and type of work. It is claimed this makes possible the welding of light and heavy work on deep metal parts.

There are markings on the horns, indicating kilovolt-ampere ratings. These welders are made with many different styles of welding tips. In



the model illustrated water cooling goes through entire arm. Machines will weld from 30 to 150 spots per minute, depending on type of work. Welders are built for foot, air or motor operation.

Reversing Motor-Drive For Planers Improved

■ Reliance Electric & Engineering Co., 1042 Ivanhoe road, Cleveland, has announced improvement of the design of its reversing motor-drive for planers, making use of armature speeds of 150-600 revolutions per minute and 100-600 revolutions per minute as against former standards of 250-1000 and 200-600 revolutions per minute.

Full horsepower capacity is maintained over entire range. Since there is less stored energy in the armature at reduced speeds, it stops quicker

ADVERTISING PAGES REMOVED

and gets under way quicker at the end of each stroke. Improvements in control equipment include a new pendent control station with extra buttons which bring added convenience for setting-up operations. Master reversing switch has been made direct-acting to speed up its operation, and rheostat panel for control of cutting and return speeds now is a separate unit so that it can be mounted within easy reach.

Skid Platform Frames Fabricated of Steel

■ Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, has placed on the market an all-steel skid platform frame designed to replace the wooden, home-made type.

Frames may be ordered in size and capacity required for the job. Clearances range from 6½ to 12 inches. Frame is shipped ready for installation of the top. It is necessary

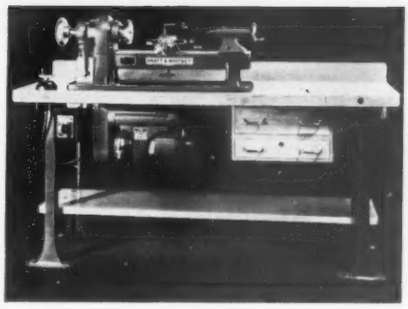
only to lay in the boards, drop the upper side angles in place, put in the bolts and tighten the nuts.

Bench Lathes Designed For Light Precision Work

■ Pratt & Whitney Inc., Hartford, Conn., announces addition to its line of two bench lathes, 7 x 16-inch and 10 x 20-inch sizes. These are designed primarily for precision work in tool rooms and experimental laboratories, where their universal features and ready adaptability are needed for a wide variety of applications on small parts necessary in tool, gage and model work. Sensitiveness and convenience of these lathes can be used also to advantage on production work for certain classes of light precision manufacturing operations, leaving the larger machine tools free for heavier work.

Lathes are designed with modern rigidness and precision, heavily built to retain their initial accuracy under severe conditions. Every control is at the fingertips of the operator. There are no change gears, speed changes being made by simply turning a graduated knob.

Both bench lathes are equipped with cam-lock spindle noses. This provides rigidity in holding chuck or face plate on the spindle. Coupled with this is its permanent accuracy



in holding the chuck or face plate central and square. A transitory drive through multiple V-belts gives smooth, even performance with an infinite number of spindle speeds within its range.

Single Unit Combines Grinder and Polisher

■ Hammond Machinery Builders Inc., Kalamazoo, Mich., presented recently a combination grinder and polisher, designated as type O. This overhanging spindle machine is especially desirable for large bulky work where extra space around the wheel is at a premium, and is useful also where production is not sufficient to warrant separate grinder and polisher units.

Top section overhangs 12½ inches from lower front of the base and spindle is 52 inches long overall. Combination switch and brake enables operator to shut off motor and spindle instantly. When wheels are being changed, spindle is held securely by a special lock. Spindle is operated through a multi-V-belt

drive from a motor in the base. Automatic motor starter has overload and low voltage protection.

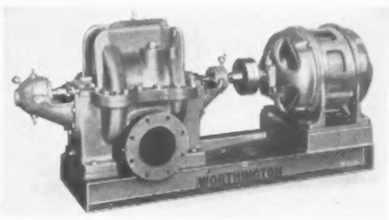
Prevents Heat Sickness

■ International Salt Co., New York, has developed a convenient moulded plastic dispenser which simplifies the distribution of salt tablets at drinking fountains in plants where industrial workers on hot jobs should use this means of maintaining a proper salt content in their blood.

Experience indicates that workmen in hot mills and similar locations who take a 10-grain salt tablet with every drink of water do not suffer from heat cramps or sickness. Dispenser slips easily into place in a bracket, holds 1000 tablets and bears a label giving directions for taking the tablets.

Centrifugal Pump Has Pickup Type Impellers

■ Worthington Pump & Machinery Corp., Harrison, N. J., has announced development of an improved two-stage centrifugal hotwell and condensate pump. Featuring oversized suction openings, pick-up type impellers, and generous vents, this line of pumps is recommended for efficient removal of condensate



under high vacuum with minimum available submergence.

Casing of the new pump is cast iron, horizontally split for ready access and removal of the rotor. Suction and discharge nozzles are in lower half of the casing; an interstage passage is cast integral with upper half of the casing. A large vent is provided to permit escape of entrained vapor.

Bronze impellers of the single-suction enclosed type, designed especially for hotwell and condensate service, are mounted on shaft with the suction openings facing inward. Back or discharge sides of the impellers thus are adjacent to stuffing boxes so that the latter are under first and second stage discharge pressures respectively, effectively preventing leakage of air into the pump.

Adds New Spray Nozzles

■ Spraying Systems Co., 4922 West Grand avenue, Chicago, has announced a new line of spray nozzles in sizes from ⅛-inch to 3 inches and in capacities from 0.5-gallon to 120 gallons per minute at 10 pounds pressure.

Nozzle delivers a full cone spray with uniform distribution suitable for gas washers, industrial washers, chemical processes or wherever pen-

etrating, rain-like spray is required. Standard stock construction is brass; other metals can be specified.

Extracts Moisture From Compressed Air Lines

■ Binks Manufacturing Co., 3114 Carroll avenue, Chicago, has announced a new pre-cooler for extraction of moisture from plant compressed air lines.

Used in conjunction with No. 540 main line oiler and water extractor, the new pre-cooler assures a maximum of efficiency in cleaning compressed air lines where excessive moisture is the greatest problem.

Outside shell dimensions are 15 inches in diameter and 36 inches long. Inside of shell is partially filled with air tubes so that the heated air goes through them and is cooled by the circulation of water around the tubes at a minimum rate of 2 gallons per minute. Cooling of air causes it to deposit moisture which is collected by the No. 540 main line oil and water trap which directly follows the pre-cooler. Surplus cooling water is piped to a sewer.

Unit will take care of 200 cubic feet of air per minute. Inlets and outlets in both pre-cooler and extractor are for 2-inch pipe.

Spiral Element Feature Of New Resistor Design

■ International Resistance Co., 401 North Broad street, Philadelphia, has announced a new line of IRC type MV high voltage resistors, featuring spiral formation of a metallized resistance element on a ceramic base, said to make practical voltages up to 100,000 at 150 watts on an 18½ x 2-inch tube.

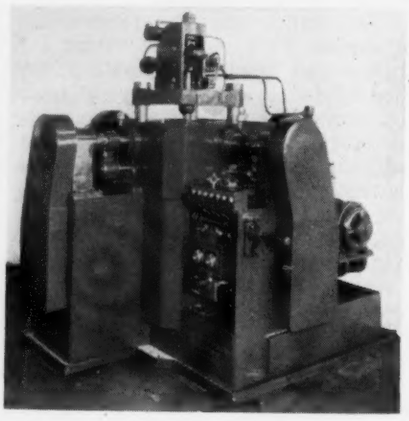
Five standard units rated at 5000, 10,000, 25,000, 50,000 and 100,000 volts are available, with a variety of special resistors obtainable for both experimental and production use. Units are available also for surge applications.

In making these resistors, filament coating is applied in spiral formation on a ceramic tube, thus providing a current conducting path of long effective length. Mechanical spacing of turns allows uniform pitch, allowing uniform voltage gradient throughout entire length of resistor. Metallized coating is protected by special phenolic baked at high temperature.

Hydraulic Machine Unit Electrically Controlled

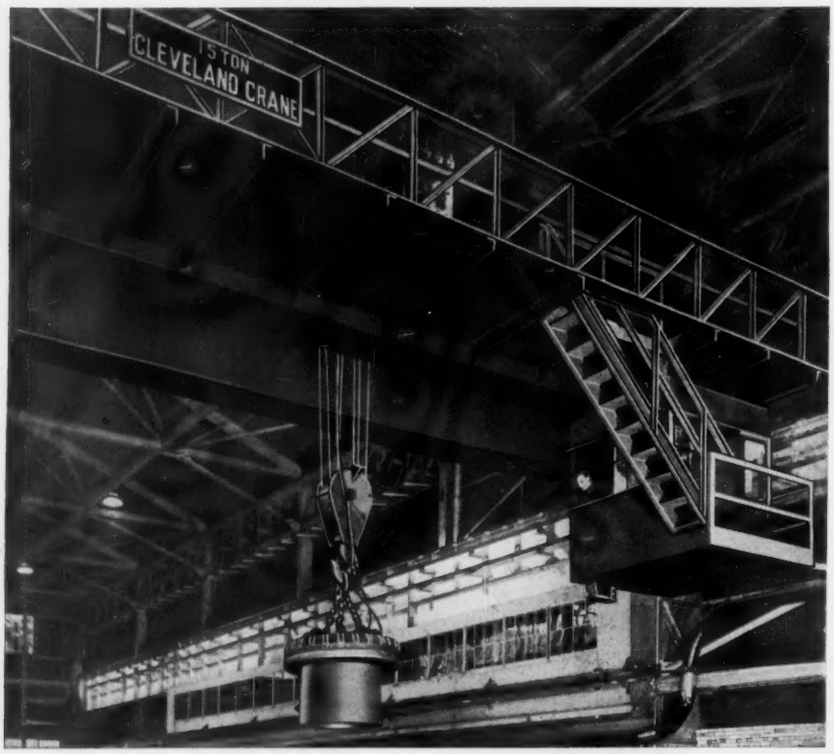
■ Reed-Prentice Corp., Worcester, Mass., has introduced a 4-way turning, chamfering, facing, centering and drilling machine for universal joint spiders.

This machine is equipped with rapid approach and rapid return to the spindles through hydraulic feed. Hydraulic mechanism is operated electrically. The fixture is also hydraulically operated for rapidly clamping the work in position. At end of cycle of operation the clamp is released automatcially allowing operator to remove finished piece and replace it with spider for the next operation.



CLEVELAND CRANES

All Welded for Every Industry



• A 15 ton 63′ 6″ span all welded Cleveland Crane in the new Strip Mill of the Jones and Laughlin Steel Corporation. This is one of many Cleveland Cranes in the various plants of this Company.

ALSO BUILDERS OF
CLEVELAND TRAMRAIL
MATERIALS HANDLING EQUIPMENT

THE CLEVELAND CRANE & ENGINEERING CO
1125 Depot St.
WICKLIFFE, OHIO
NEW YORK • DETROIT PITTSBURGH • CHICAGO

Assembly Serving

(*Concluded from Page* 43)

point on the assembly line where they are to be used.

A gantry crane is employed to unload sheet steel for fenders, pans and other body parts. The crane takes this material directly from incoming cars to the forming presses. After parts are formed and inspected, they are placed on skids such as those in Figs. 2 and 4. Battery powered trucks then pick up skids and carry the load to finishing department and from there to the assembly line.

Solve Electrolytic Manganese Problem

■ A successful solution of the electrolytic manganese problem, which provides a method for recovery of high-purity metallic manganese from low grade ores, is recorded in a progress report recently published by the bureau of mines.

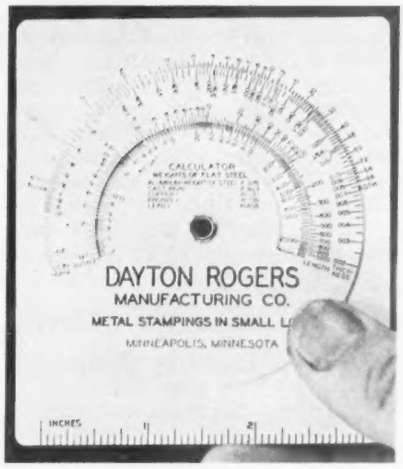
In this process the ore is roasted in a reducing atmosphere to convert higher oxides of manganese oxide. This is done in an externally heated rotating kiln similar to that used in the Caron-Clevenger process. Ore must be cooled in a reducing atmosphere. Roasted ore then is leached with spent electrolyte from electrolytic cells. Leach liquor is treated for removal of impurities. Iron and arsenic are removed by addition of manganese dioxide, which occurs as an anode product during electrolysis and agitation with air. Precipitated ferric hydroxides with occluded arsenic are removed by filtration. Solution then is treated for cobalt and nickel, which have been found to be highly detrimental to the electrolysis of manganese. After filtration solution passes to reservoir feeding the electrolytic cell.

Copies of the paper, designated as "Progress Reports—Metallurgical Division, No. 24, Electrometallurgical Investigations," may be obtained from the bureau of mines, Washington.

Circular Slide Rule Gives Flat Metal Weight

■ A slide rule that will give instantly the correct weight of flat steel, aluminum, cast iron, copper, bronze and lead in widths from ⅛-inch to 96 inches, in thicknesses from 0.002-inch to 25 inches, in lengths from 1 inch to 1000 feet and in weights from 0.1-pound to 10,000 pounds, has been released for distribution by Dayton Rogers Mfg. Co., Minneapolis.

This little circular pocket rule is



This slide rule simplifies calculation of the weight of flat metals in a wide variety of lengths, widths and thicknesses

a convenient calculator for purchasing agents, engineers, salesmen, estimators, draftsmen, foremen or anyone requiring weights of different flat metals quickly and accurately. Interested persons may obtain one of these rules by writing to the above company.

Combination Stamping

(*Concluded from Page* 63)

many articles of this general classification where several operations are required, the metal from the coil strip is straightened, oiled and fed through roll feeds, and through a number of dies. In most high speed operations, the object is carried right in the strip while the various operations are being performed.

In other instances, grip feeds transfer the shell or stamping from one operation to the next depending on the article to be produced. The trend in the production of small parts is toward higher speed in high production presses, which are fitted with precision feeds and accurately designed tools.

Hardenability of Steel

(*Concluded from Page* 58)

the effects of carbon, manganese, silicon and phosphorus on the hardenability of a steel. Effects of aluminum additions on hardenability, through the effect on grain size were also measured. The hardenability effects, independent of the quenching effect, were also interpreted.

■ DISCUSSION of the mechanism by which the decomposition products of austenite form, of the nature of these products, and of the factors which determine the rates of decomposition at different temperatures was presented by Robert F. Mehl, director of the metals research laboratory of the department of metallurgy, Carnegie Institute of Technology, Pittsburgh, as a contribution to the physics of hardenability. An analytical expression for the isothermal reaction curve for the formation of pearlite was given, based on the formation of nuclei at the grain boundaries of austenite and radial growth from these nuclei; this permits conclu-

sions to be drawn concerning the effect of austenite grain size, of rate of nucleation and of rate of growth upon the form of the isothermal reaction curve, and affords methods by which rates of nucleation and rates of growth may be approximated.

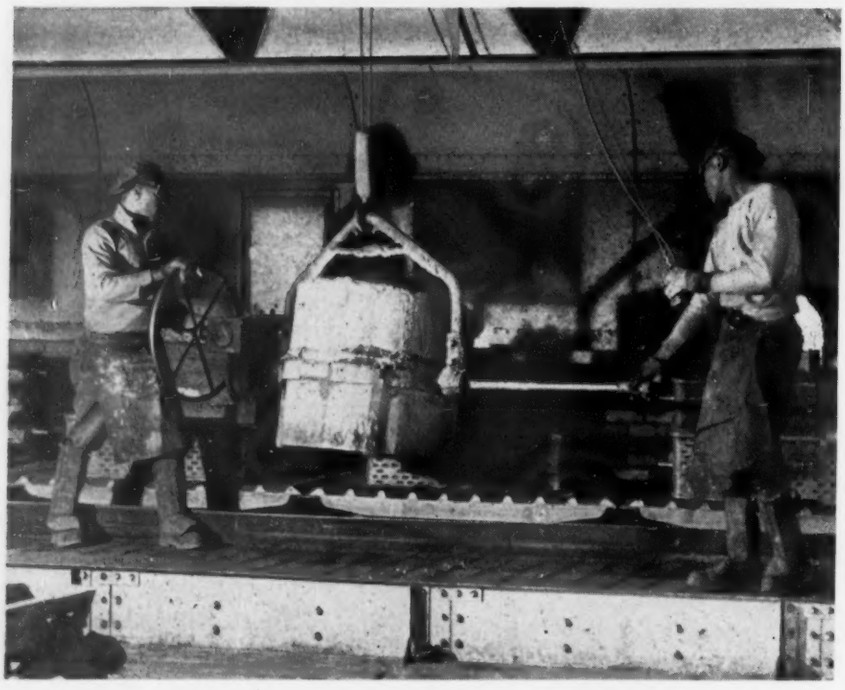
The variation in the interlamellar spacing in pearlite with temperature and the variation in the diffusion coefficient of carbon in austenite with temperature may be used to predict a rate of growth increasing with decreasing temperature.

Foundry Handling System Lowers Operator Fatigue

■ Modern materials handling equipment not only provides greater efficiency in production, but serves the operators by lightening their tasks and reducing fatigue in many ways. One excellent example is in pouring liquid iron into sand molds in the foundry of Pontiac Motors Corp. Casting engine blocks form the largest department in this particular plant. Here molds move along an engine block line, while the workmen ride along with the line on an escalator. This reduces walking to a minimum and permits operators to direct the stream of hot metal with steady hands. Hoist movements are guided by push-button control.

The ladle itself is suspended from an overhead monorail and moves along with the men. This line has a capacity of 120 blocks an hour. Openings in the background are those of the new ventilating system, installed for the 1938 model run. It clears the air and carries off fumes, dust, heat and grit. This is a distinct protection for the workmen. It is claimed that since installation of this ventilating system, efficiency of the motor block line has increased 15 to 20 per cent.

Platform, ladle and molds all move together in this highly mechanized foundry setup



Purdue Foundry Meeting Surveys Recent Progress

(*Concluded from Page* 64)

Temperature is reduced from 1400 degrees to 1320 degrees Fahr. in 8½ hours and the castings are held at 1320 degrees for 8 hours. After that holding period, the castings are cooled to 1225 degrees in 8 hours and then pulled from the furnace.

Short cycle annealing was discussed by W. D. McMillan, International Harvester Co., Chicago. He said that in general annealing cycles have been shortened by mechanical and metallurgical methods. Shortening by mechanical means is largely a matter of design of the furnace and by the application of nonscaling, nondecarburizing atmosphere which has made it possible to eliminate pots and packing. Metallurgical means of reducing the annealing cycle involve use of high silicon content ranging from 1.55 to 1.70 per cent which speeds up graphitization to a considerable degree. Hence a combination of the two methods leads to the shortest possible annealing cycle.

Discussing malleable furnace refractories, Carl Wirth, Terre Haute Malleable & Mfg. Co., Terre Haute, Ind., said the refractory giving the most trouble at present is the bungs which are subjected to the severest operating condition of the furnace from the standpoint of thermal shock. Operating practice will determine the type of brick to be used.

If the bungs can be handled with extra care, a soft type brick will be best, but if the bungs must be stacked, then harder brick must be employed. He mentioned that bungs made of 9-inch and 13½-inch brick in alternate rows, that is, two rows of the latter and three rows of the former, last 30 to 40 per cent longer than bungs made entirely of 13½-inch brick.

At one of the gray iron sessions, R. H. Farabee, professor of metallurgical engineering, Purdue university, presented a lecture on "Metallography for the Practical Foundrymen" in which he discussed the effect of carbon, silicon, manganese, phosphorus and sulphur upon the structure of iron. He also correlated the metallographic constituents and some of the mechanical properties of cast iron.

Prof. Farabee developed the idea that any graphite formed in high-strength iron should be finely divided, rounded in form and evenly distributed. By use of various alloying elements, the strength of the iron matrix can be improved and a more favorable effect on the behavior may be obtained.

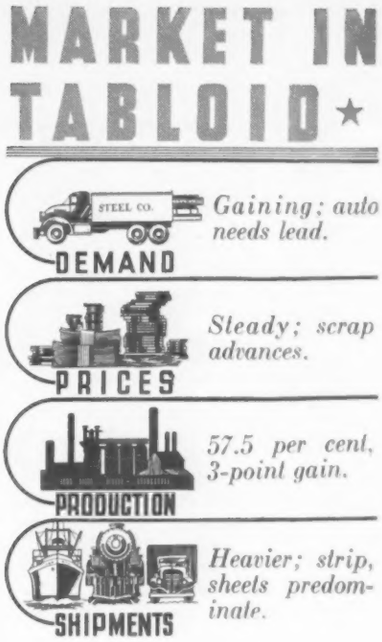
German Handbook on Perfect Foundry Casting

■ *Irreproachable Castings* (Einwandfreier Formguss), by Erdmann Kothny; paper, 64 pages, 6 x 9 inches; published by Julius Springer, Berlin, Germany; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

This volume, which is printed in German, is one of a series of technical handbooks on various fields. It is the second edition of a work which previously was published under the title of Gesunder Guss (Wholesome Castings). The book is divided into six chapters, of which the first discusses the art and advantages of casting. The second describes the general conditions required for producing irreproachable (high quality) castings, while the third chapter gives information on the properties of the most important casting materials, such as alloyed and unalloyed gray iron, chilled iron, malleable cast iron, etc. Chapter IV discusses the shape or form of the cast pieces and chapter V conditions for pouring or casting. The sixth and final chapter deals with other foundry processing to insure production of sound castings.

Output Rises Sharply To Year's Best Level

Flat-Rolled Steel Is Factor; Pig Iron Production Up



■ STEEL ingot production has been given an extra-seasonal boost to the year's best level by heavier output of flat-rolled steel and appears to be running ahead of the upturn in actual consumption.

At the same time, requirements of most steel users still are expanding, and total demand is bolstered by relatively brisk activity in the automotive industry. With mill operations up sharply in some districts to accommodate recent heavy bookings of sheets and strip, however, there is the suggestion that part of this additional output is going into stock rather than into consumption.

A 3-point rise to 57.5 per cent in the national steelmaking rate last week moved the average about 20 per cent higher than a month ago. While this outdistanced the upturn in operations of some leading steel users during the same period, the rise in motorcar assemblies has been even more spectacular.

Automobile production of 80,030 units last week more than tripled the early-October volume and compares with 73,335 units the week before. In addition to being the highest weekly output in 1938 to date, it made the best relative showing so far this year with the corresponding 1937 period. Automotive output was tending downward a year ago, assemblies for the week being 89,770 units.

Pig Iron Production Gains 22.8 Per Cent In October

October pig iron production totaled 2,067,499 gross tons, a gain of 22.8 per cent over September output of 1,683,097 tons and the largest since October, 1937, with 2,891,026 tons. Daily average production of 66,694 tons was 18.9 per cent ahead of September's, about equal to the 66,901 tons for November last year and comparing with 93,259 tons for October, 1937.

Pig iron output for the first ten months this year totaled 14,390,284 tons, against 33,198,634 tons in the 1937 period, a decrease of 56.7 per cent, and well below the 24,601,570 tons for 1936. Seventeen blast furnaces became active last month, the largest addition in any month since April, 1936, when the same gain was made. Active furnaces the end of October totaled 114, best since November, 1937.

Practically all districts contributed to last week's rise in steelmaking, with the national rate highest since the middle of October last year at 63 per cent. Chicago mills stepped up 10 points to 56.5 per cent, Pittsburgh rose 3 points to 45 per cent and Youngstown increased 2 points to 63 per cent.

Gains at other centers included 1 point in eastern Pennsylvania to 35 per cent, 2 points at Buffalo to 51 per cent, 11 points at Birmingham to 68 per cent, 16 points in New England to 71 per cent, 5 points at Cincinnati to 75 per cent, 2.5 points at St. Louis to 45.5 per cent, 3 points at Detroit to 85 per cent and 3 points at Cleveland to 77 per cent. Wheeling was unchanged at 59 per cent.

Only Small Orders From Railroads In Prospect

Outlook for steady or heavier steel demand varies among different consumers. In addition to the favorable situation in the automotive industry, shipwork and building and engineering construction are counted on for relatively good business. Little is looked for from the railroads in the near future, unless the recent rail wage decision prompts the release of some orders that were held up awaiting the board's findings.

Freight car awards in October totaled 2537, against 1355 a year ago. Orders for ten months of 12,520 cars, consisting principally of purchases by the Southern railway, compare with 51,061 a year ago and 39,523 in the corresponding 1936 period.

Scrap markets are stronger as a consequence of latest steelmaking gains. Price advances at Chicago boost the scrap composite 25 cents to $14.29, while the iron and steel composite is up 2 cent for the same reason to $36.56. Finished steel prices are considerably steadier than a month ago, the composite being unchanged last week at $57.20.

Export scrap business continues fairly active, outstanding being Japan's purchase of 160,000 tons. While Japan remains the leading foreign buyer of United States scrap, shipments to that country the first nine months dropped 47.5 per cent to about 945,000 tons. Total movement in the same period was 2,164,857 tons, a decrease of only 34 per cent since a year ago.

COMPOSITE MARKET AVERAGES

	Nov. 5	Oct. 29	Oct. 22	One Month Ago Oct., 1938	Three Months Ago Aug., 1938	One Year Ago Nov., 1937	Five Years Ago Nov., 1933
Iron and Steel	$36.56	$36.54	$36.54	$36.48	$36.50	$38.96	$30.25
Finished Steel	57.20	57.20	57.20	57.04	57.20	61.70	49.20
Steelworks Scrap..	14.29	14.04	14.04	14.00	14.44	13.32	9.64

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Nov. 5, 1938	Oct. 1938	Aug. 1938	Nov. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.74
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.455
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.435
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.10	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.15	3.20	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.10	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.15	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Nov. 5, 1938	Oct. 1938	Aug. 1938	Nov. 1937
Bessemer, del. Pittsburgh	$22.34	$22.34	$21.34	$25.26
Basic, Valley	20.50	20.50	19.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	21.34	25.26
No. 2 foundry, Pittsburgh	22.21	22.21	21.21	25.21
No. 2 foundry, Chicago	21.00	21.00	20.00	24.00
Southern No. 2, Birmingham	17.38	17.38	16.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	19.89	23.89
No. 2X, Del. Phila. (differ. av.)	23.215	23.215	22.215	26.135
Malleable, Valley	21.00	21.00	20.00	24.00
Malleable, Chicago	21.00	21.00	20.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.14
Gray forge, del. Pittsburgh	21.17	21.17	20.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	97.77	107.35

Scrap

Heavy melting steel, Pittsburgh	$14.75	$14.95	$15.20	$14.10
Heavy melt. steel, No. 2, E. Pa.	12.75	12.95	13.00	12.25
Heavy melting steel, Chicago	13.75	13.05	14.00	12.55
Rails for rolling, Chicago	17.25	16.25	18.25	15.10
Railroad steel specialties, Chicago	15.75	15.55	16.75	16.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.37
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Tin Mill Black Plate

Pittsburgh	3.15c
Chicago, Gary	3.15c
Granite City, Ill.	3.25c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.35
Granite City, Ill.	5.45

Mfg. Terne Plate

Pittsburgh, Gary, Chgo.	4.65c
Granite City, Ill.	4.75c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New Cork, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

* Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20
4100	0.15 to 0.25 Mo.		0.55
4600	0.20 to 0.30 Mo. 1.50-2.00 Ni.		1.10
5100	0.80-1.10 Cr.		0.45
5100	Cr. spring flats		0.15
6100	bars		1.20
6100	spring flats		0.85
Cr. N., Van.			1.50
Carbon Van.			0.85
9200	spring flats		0.15
9200	spring rounds, squares		0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot strip to 23⅛-in.

Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled	Strip
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	$43.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
¼-⅞-in., incl.	65-10	70-5
½-⅞-in., incl.	65-5	70
⅝-1-in., incl.	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in. smaller	67½-10 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	70-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland	3.40c
Structural, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Clev., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$27.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.44	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, Phil, base, standard and copper bearing, $27.63.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

Silvery†

Jackson count, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., New Orleans 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 97.75
2% carbon 102.75 1%, 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. tl., ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. ... 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls... $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots ... 150.00

15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c

88% chrome, contract ... 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. .. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton .. $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	....	5.15
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.25	6.00	3.85	3.95	5.45	3.80	6.20	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars: 2300	3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Nov. 3

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si...	$26.18 5 10 0	$17.60	2 2 0
Basic bessemer	....	18.65	2 4 6
Hematite, Phos. .03-.05	30.94 6 10 0*	.....	.....
Billets	$37.49 7 17 6	$39.82	4 15 0
Wire rods, No. 5 gage	53.67 11 5 6	42.95	5 2 6
Standard rails	$48.20 10 2 6	$48.19	5 15 0
Merchant bars	2.33c 11 0 0	1.95c to 2.00c	5 2 6 to 5 5 0
Structural shapes	2.25c 10 12 6	1.85c	4 17 6
Plates, †¼ in. or 5 mm.	2.45c 11 11 3	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.76c 13 0 0	2.95c	7 15 0*
Sheets, gal., 24 ga., corr.	3.34c 15 15 0	3.42c	9 0 0
Bands and strips	2.81c 13 5 0	2.19c	5 15 0
Plain wire, base	4.13c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.93c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	3.92c 18 10 0	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 5.06 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reic Mark
Fdy. pig iron, Si.2.5..	$25.94	5 9 0(a)	$15.91	598	$16.90	500	$25.24	63
Basic bess. pig iron..	23.80	5 0 0(a)	.....	...	.....	...	27.84 (b)	69.50
Furnace coke	6.55	1 7 6	5.45	205	7.27	215	7.61	19
Billets	37.49	7 17 6	22.34	840	29.07	860	38.66	96.50
Standard rails	2.15c	10 2 6	1.38c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.59c	12 4 0††	1.30c	1,080	1.65c	1,100	1.99c	110
Structural shapes	2.34c	11 0 6††	1.27c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm	2.48c	11 14 3††	1.62c	1,350	2.06c	1,375	2.29c	127
Sheets, black	3.34c	15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.92c	18 10 0	2.70c	2,250	4.13c	2,750	6.66c	370
Plain wire	4.13c	19 10 0	1.98c	1,650	2.48c	1,650	3.11c	173
Bands and strips	2.74c	12 19 0††	1.45c	1,210	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 72 per cent over paper sterling.

—The Market Week—

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†11.00
Bos. dock No. 1 exp.	13.00-13.25
New Eng. del. No. 1	13.00
Buffalo, No. 1	14.00-14.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.75-13.25
Chicago, No. 2 auto	11.50-12.00
Cincinnati, dealers	11.25-11.75
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	9.50-10.00
Detroit (industrial)	10.75-11.25
Eastern Pa., No. 1	14.50-15.00
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	11.75-12.25
Granite City, R. R.	12.75-13.25
Granite City, No. 2	11.75-12.25
Los Angeles, No. 1	13.00-13.50
Los Angeles, No. 2	12.00-12.50
N. Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R. R.)	15.75-16.25
Pittsburgh, No. 1	14.50-15.00
Pittsburgh, No. 2	13.25-13.75
St. Louis, R. R.	12.75-13.25
St. Louis, No. 2	11.75-12.25
San Francisco, No. 1	12.00
Seattle, No. 1	10.00-12.00
Toronto, dlrs. No. 1	10.00-10.50
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	12.75-13.25
Chicago, dealer	12.50-13.00
Cincinnati, del.	10.00-10.50
Cleveland	13.00-13.50
Detroit	11.25-11.75
E. Pa., new mat.	14.50-15.00
E. Pa., old mat.	10.50-11.00
Los Angeles	12.50-13.00
Pittsburgh	14.50-15.00
St. Louis	11.00-11.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	13.25-13.75
St. Louis	7.75- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	9.00- 9.50
Cincinnati, dealers	6.00- 6.50
Detroit	8.00- 8.50
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	6.50- 7.00
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	6.50- 7.00
Cincinnati, dealers	3.75- 4.25
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	8.50- 9.00
Los Angeles	4.00- 4.25
New York	†3.50- 4.00
Pittsburgh	9.25- 9.75
St. Louis	4.50- 5.00
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.50- 9.00
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Detroit	6.50- 7.00
Pittsburgh	10.25-10.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.50
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.50- 6.00
New York	†2.50- 3.00
Pittsburgh	8.25- 9.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	8.00- 8.50
Chicago	5.50- 6.00
Cincinnati, dealers	3.25- 3.75
Cleveland	7.25- 7.75
Detroit	5.50- 6.00
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.00- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.50-16.00

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.00-16.50
Chicago, leaf	15.50-16.00
Eastern Pa.	16.50-17.00
Pittsburgh	16.50-17.00
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	16.00-16.50
Detroit	16.50-17.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	16.50-17.00
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.00-16.50
St. Louis	13.75-14.00
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	13.75-14.00

ARCH BARS, TRANSOMS

St. Louis	14.50-15.00

PIPE AND FLUES

Cincinnati, dealers	6.00- 6.50
Chicago, net	8.50- 9.00

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	6.75- 7.25
Eastern Pa.	13.50
New York	†8.50- 9.00
St. Louis	8.50- 9.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Chicago, No. 1 net	10.00-10.50
Eastern Pa., No. 1	15.00-15.50
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.75-13.25
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†7.25- 7.50
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	9.00- 9.50
Los Angeles	9.00
Pittsburgh	13.00-13.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	16.50-17.00
Pittsburgh, crops	17.00-17.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	16.50-17.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†15.00-15.50
Eastern Pa.	17.00-17.50
St. Louis	16.50-17.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	18.50-19.00
Eastern Pa.	21.50-22.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	14.00-14.50

SHAFTING

Boston district	†14.75-15.00
New York	†15.00-15.50
Eastern Pa.	19.50-20.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.00-15.50
Cincin., iron, deal.	13.25-13.75
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	16.50-17.00
St. Louis, iron	13.75-14.25
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	11.50-12.00
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.75-11.25
Chicago, auto net	12.50-13.00
Chicago, railr'd net	11.50-12.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal	12.50-13.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.00-14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	12.00-12.50
St. L., No. 1, mach.	14.25-14.75
St. Louis, agr. mach.	12.75-13.25
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	11.50-12.00
Detroit, break	9.50-10.00
Eastern Pa.	16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.00-11.50
Pittsburgh, break	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	6.75- 7.25
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	10.00-10.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	11.25-11.75
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	11.75-12.25

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

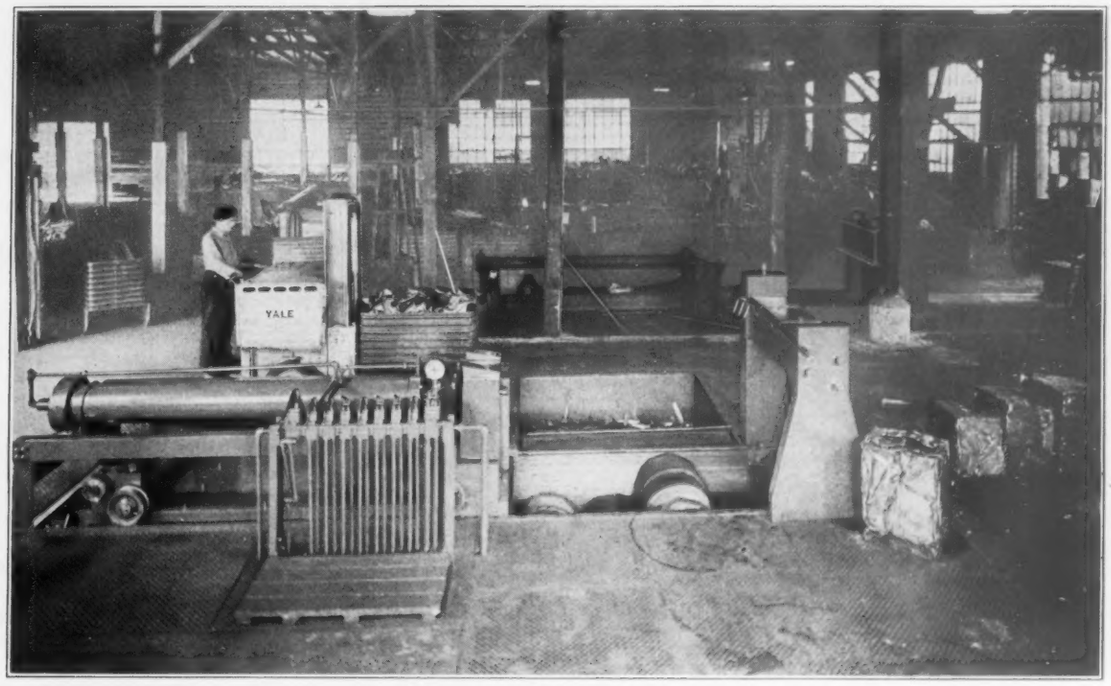
Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	13.00
Swedish low phos.	13.00
Spanish No. Africa basic, 50 to 60% nom.	9.00
Tungsten. sh. ton. unit, duty pd. nom.	$21.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-32.00
So. African, 50-52% nom.	30.00-32.00
Indian, 50-52%	Nominal

LOGEMANN
Scrap Balers



Baled scrap pays substantial dividends . . . . saves space . . . . can be more economically handled and loaded . . . . is practically free from corrosion and saves much heat in remelting . . . . can be held for favorable price periods.

LOGEMANN scrap metal presses are obtainable in various sizes and types. Ask for circulars.

Please state character of scrap, daily tonnage and range of gauges, when writing.

LOGEMANN BROTHERS CO.
3126 W. BURLEIGH ST., MILWAUKEE, WIS.

Sheets

Sheet Prices, Page 76

Pittsburgh — Sheet mills have stepped up operations in order to keep even with required deliveries. As a result, output of common and full finished material is above 55 per cent, although galvanized production has dipped seasonally below 65 per cent. Improvement in automotive operations has affected sheet mill schedules materially, although a number of miscellaneous consumers contribute to the higher rate. So far mills generally have had no trouble in making requested deliveries.

Cleveland—While new business has fallen off considerably from the abnormally high levels prevailing during the period of price weakness, a steady influx of orders continues from those smaller consumers who failed to cover for their requirements at lower prices. Extensive backlogs make it increasingly difficult for producers to meet prompt deliveries requested on recent orders. Substantial improvement in demand has been noted from electrical household equipment concerns. Stove and refrigerator manufacturers have entered the market recently for considerable tonnage as work on the 1939 series gets underway. Prices on all grades of sheets and strip are said to be holding firmly at the higher levels.

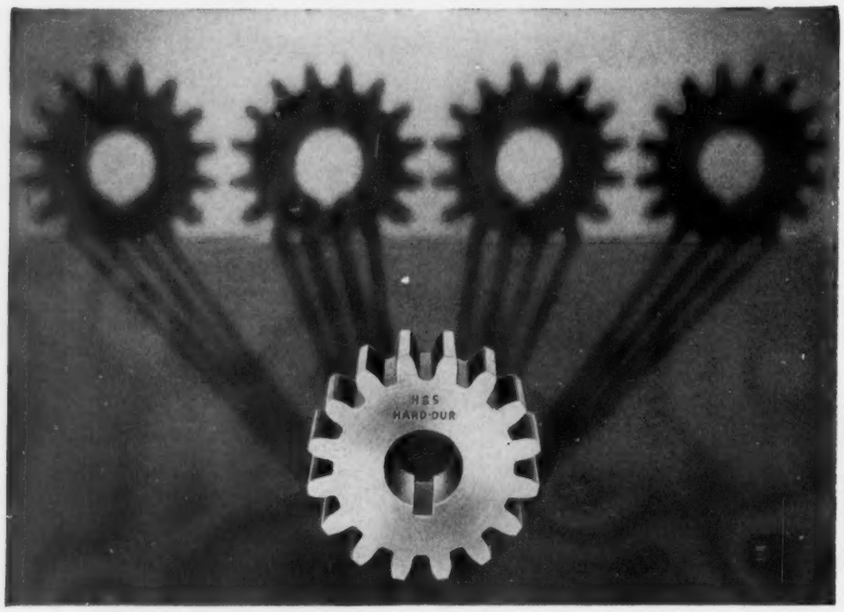
Chicago — A substantial share of increased production of sheets here is for the automotive industry. Shipments are expected to be well maintained in the near future, with resumption of automotive purchases anticipated in December. Some interests report heavier output of flat-rolled steel reflects mainly the increase in demand from miscellaneous users. Sales are off markedly since the recent period of price weakness.

Boston — Sheet releases and deliveries are the best in weeks, but new buying, expected to be light during the remainder of the quarter, has dwindled. Jobbers are generally covered ahead for the next few weeks, but business of secondary sellers holds fairly well, miscellaneous repairs and better consumption by small consumers resulting in numerous orders. Stamping shops and stove makers also are working off sheets in better volume, while producers of household appliances in most instances are more active. Prices are firm with only isolated shading by some secondary sellers.

New York — While new orders are light, sheet fabrication continues to expand. Principal improvement lately has been in electrical household equipment and in automobile accessories. Demand from stove and heater manufacturers and for building construction has leveled off somewhat. Stainless steel sheets are more active, not having been influenced by recent price concessions in flat-rolled steel.

Philadelphia — Sheet buyers who failed to anticipate requirements previously are placing some tonnages at full market prices. Most producers have asked customers to schedule shipments against purchases at recent concessions, and in many instances deliveries will extend to mid-December. Auto body and frame interests are taking sheets actively. The Lewisburg, Pa., penitentiary has awarded Wheeling Steel Corp. 415 tons of sheets, including 150 tons of 22 gage hot-rolled at 3.00c, delivered, and 200 tons of 18 gage at 2.61c. Quotations include 21 cents freight.

Buffalo—While new sheet business has tapered, production has quickened, as mills seek to fill heavy orders booked during the recent period of lower prices. Only a small



4 TIMES THE LIFE

at only 50 per cent extra . . .

"HARD-DUR" Gears preserve the tooth form. They are made only of the finest gear steels and are scientifically heat treated to obtain the maximum physical properties. They are so much stronger, harder and more wear-resistant than similar untreated gears that they are guaranteed to have four to five times the life at only 50 per cent extra in cost. "HARD-DUR" Gears handle the tough jobs on which ordinary gears fail and when used on the average job they last almost indefinitely. A trial will prove their superiority and economy.

A valuable 448 page Gear book will be sent on request.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

amount of additional buying is looked for this quarter since a number of consumers are believed to have covered all of their probable requirements. Sales to automotive interests are slightly heavier but still lack large volume.

Cincinnati — While a large part of current sheet output represents tonnage booked at price concessions, considerable new buying indicates backlogs do not cover all consumers for the entire quarter. Shipments are stimulated by expanding automotive needs, but improvement also is noticeable elsewhere.

St. Louis — Sheet shipments are well maintained and mill backlogs have increased substantially since a month ago. While inventories of consumers generally are light, some are stocking material.

Birmingham, Ala. — Sheet production continues at capacity with no early let-up in demand indicated. Some backlog of business is still on books.

Strip

Strip Prices, Page 77

Pittsburgh—Strip production has been increased about 5 points to 50 per cent, with cold mills still holding a slight edge. Operations are dependent in a large measure on automotive orders.

Boston—Incoming cold strip volume is heavier than expected in view of substantial covering by numerous consumers during the period of price concessions on low carbon material. A good part of new business, however, is on high carbon stock which did not decline. Makers of automobile accessories are active buyers of high carbon and aggregate volume of new tonnage is back to at least the point prevailing before the price weakness. Meanwhile, releases against orders taken at lower prices are steady, with mill operations up materially, a condition likely to continue during the remainder of the quarter.

New York—Narrow cold-rolled low carbon strip releases are substantial, with finishing operations up at most eastern mills. New buying is well sustained, notably for high carbon strip by automobile partsmakers and miscellaneous users placing better volume in many instances. Consumers in some cases are pressing for delivery on orders taken at lower prices. Consumption has improved materially, which, coupled with low inventories, has resulted in requests for an early place on rolling schedules.

Birmingham, Ala. — Strip output is light as most strip produced here is cotton ties, the season for which has virtually run its course.

Plates

Plate Prices, Page 76

Pittsburgh — Barge building is active. One of the latest orders involved a number of barges for New York harbor service, to be furnished by Dravo Corp. and Jones & Laughlin Steel Corp., Pittsburgh. The former recently completed delivery on several other orders.

Cleveland — Plate inquiries are slightly heavier, improved demand appearing from industrial sources for equipment repairs and also from increased activity in structurals. Outstanding railroad inquiry is for plates and shapes required by the Chesapeake & Ohio for repairs to 870 cars, bids closing Nov. 7.

Boston — Plate requirements for specified work are well sustained, large-diameter pipe, including two 102-inch inverted siphons, taking close to 2500 tons. Bids are in and some of the work may go concrete as in the case of the 30 and 48-inch Portland, Me.-Lake Sabago water line, several thousand tons being lost

Ball and Roller Bearing Manufacturers Recommend

TRADE MARK NON-FLUID OIL REGISTERED IN U.S. PAT. OFFICE & FOREIGN COUNTRIES

to Insure Long Life and Dependable Service

Approved by practically all leading makers after exhaustive laboratory and practical service tests showed NON-FLUID OIL guards against trouble and expense caused by most grease lubricants.

Send for testing sample today-prepaid. NO CHARGE!

NEW YORK & NEW JERSEY LUBRICANT CO.

Main Office: 292 MADISON AVENUE, NEW YORK

WAREHOUSES:

Chicago, Ill. — St. Louis, Mo. — Providence, R. I. — Detroit, Mich. — Atlanta, Ga. — Charlotte, N. C. — Greenville, S. C.

TRADE MARK NON-FLUID OIL REGISTERED IN U.S. PAT. OFFICE & FOREIGN COUNTRIES

MODERN STEEL MILL LUBRICANT

Better Lubrication at Less Cost per Month

to plate mills. Shipyard releases are steady, with standpipe inquiries offering several units; also an elevated tank, Northampton, Mass., closing Nov. 15. A district builder of asphalt plants has booked government orders requiring fair tonnage. The Holyoke, Mass., pipe fabricator has built up a good backlog.

Chicago — Plates are moving actively for bridge work, and building of freight cars for the Southern railway will aid shipments. In addition to tanks, pipe lines and waterworks equipment, for which there is fair plate demand, miscellaneous requirements are relatively heavy.

New York — Miscellaneous plate demand is expanding slowly. Shipwork is promising, and better business from public utilities is in prospect, but the railroad outlook has been dimmed by the wage decision. Pending tonnages for shipbuilding are the highest in many months, with 155,400 tons involved in various cargo boats for the maritime commission and four battleships.

Philadelphia — Navy department opened bids Nov. 2 on three battleships, each requiring about 16,000 tons of plates, and a fourth probably will be placed with the Norfolk navy yard within two weeks. Bethlehem Shipbuilding Corp., Newport News Shipbuilding & Dry Dock Co. and New York Shipbuilding Corp. each bid on one ship. Additional small plate releases are noted against merchant vessels already under contract, but business from private sources continues disappointing. Export business is helping operations of some mills. Domestic prices are firm.

St. Louis — Miscellaneous plate demand is heavier, with better shipments noted to drum and small tank manufacturers. Specifications from boat and barge builders are in fair volume. Recent freight car orders aid the outlook.

Birmingham, Ala. — Although mills are unable to indicate particularly large sources of demand, business in plates has stepped up, during the past week, because of the consistent volume of orders from widely scattered sources.

San Francisco — Of special interest in the plate market is the call for bids to be opened at Washington, for 9387 tons of plates, sheets and strip for the Mare Island, Calif., navy yard under schedule 4760. Other inquiries are confined to lots of less than 100 tons and no awards of size were reported. To date 37,292 tons have been placed, compared with 45,802 tons for the same period a year ago.

Seattle—Inquiry for pipe and boiler jobs is improving as annual marine repair projects are up for consideration. Largest tonnage immediately pending is 850 involved in construction of a survey steamer awarded to Lake Washington Shipyards, Seattle. U. S. engineer, Portland, will open bids Nov. 15 for a 10,000-barrel diesel oil storage tank for Empire, Oreg., $15,000 available, involving 100 tons or more, with pumping equipment also required.

Plate Contracts Placed

445 tons, welded standpipe, Washington suburban sanitary commission, Wheaton, Md., to Chicago Bridge & Iron Co., Chicago.

265 tons, standpipe, 25 x 144 feet, Ambridge, Pa., to Chicago Bridge & Iron Co., Chicago.

165 tons, bin structure, Cater Coal Co., Coalwood, W. Va., to Tippett & Wood, Phillipsburg, N. J.

100 tons, tank and tower, veterans' hospital, Amarillo, Tex., to Chicago Bridge & Iron Co., Chicago.

Plate Contracts Pending

9387 tons, plates, sheets and strip, schedule 4760, Washington, D. C., for Mare Island, Calif.; bids Nov. 4.

850 tons, coast survey steamer, Lake

KEEP THESE COST CUTTING IDEAS within Easy Reach!

Get Your Free Copy of This Great New Book!

This new book gives dozens of ways to save money in your plant—whether you're operating a steel mill, machine shop, laundry, wire mill, foundry or anyplace where loads are lifted, lowered or moved. Its "candid" photos show the many opportunities for efficient application of P&H Hoists to almost any material handling process. By following procedure recommended in its pages, users report savings as high as $2200 per year—savings available to you now! Your free copy of "Handle It Off the Floor" is ready for you—send for it today! . . . Use the handy coupon.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

HARNISCHFEGER CORPORATION
4411 W. National Avenue, Milwaukee, Wisconsin
Please send me my copy of Bulletin H-5, "Handle It Off the Floor."
My handling problem is.....
Firm Name..... By..... Title.....
Address..... City..... State.....

Send This Coupon—NOW!

Washington Shipyards, Seattle, general contractor.

500 tons, 36 and 42-inch watermain, section 2, Oakwood avenue, Hartford, Conn.; F. B. O'Neil & Co., Hartford, contractors.

100 tons or more, 10,000-gallon diesel oil storage tank for Empire, Oreg.; bids to U. S. engineer, Portland, Nov. 15.

100 tons, 200,000-gallon elevated tank, Northampton, Mass.; bids Nov. 14 to board of water commissioners; Morris Knowles Inc., Pittsburgh engineer, has plans; estimate $18,000.

100 tons or more, relay barge or floating booster plant, Panama, United States Steel Products Co., New York, low, $190,500, bids Nov. 2, schedule 3389.

Unstated tonnage, 10,000-barrel fuel oil tank. Empire, Oreg., bids Nov. 15, U. S. engineer, Portland, Oreg., schedule 208.

Bars

Bar Prices, Page 76

Pittsburgh—Automotive demand is supplying a large share of current bar business, especially in cold-finished material. At the same time, good support is coming from widely diversified users. Ordering is largely for immediate use as consumers are content to allow mills to carry inventories for them so long as early delivery is available. Little pressure for price concessions is noted.

Cleveland — Bar consumers are taking larger lots, reflecting to a considerable extent increased automotive activity. Demand elsewhere is improving less rapidly. Little improvement in specifications from farm equipment makers is expected for another 30 days. Mill operations are higher, with deliveries still available within two weeks if necessary.

Chicago — Sales of both carbon and alloy bars have risen here, although betterment is not shared by all producers. Automotive needs are the largest single source of demand, but general requirements are also up. Tractor requirements of bars have shown slow but fairly steady improvement, though still not as high as anticipated, in view of increased production.

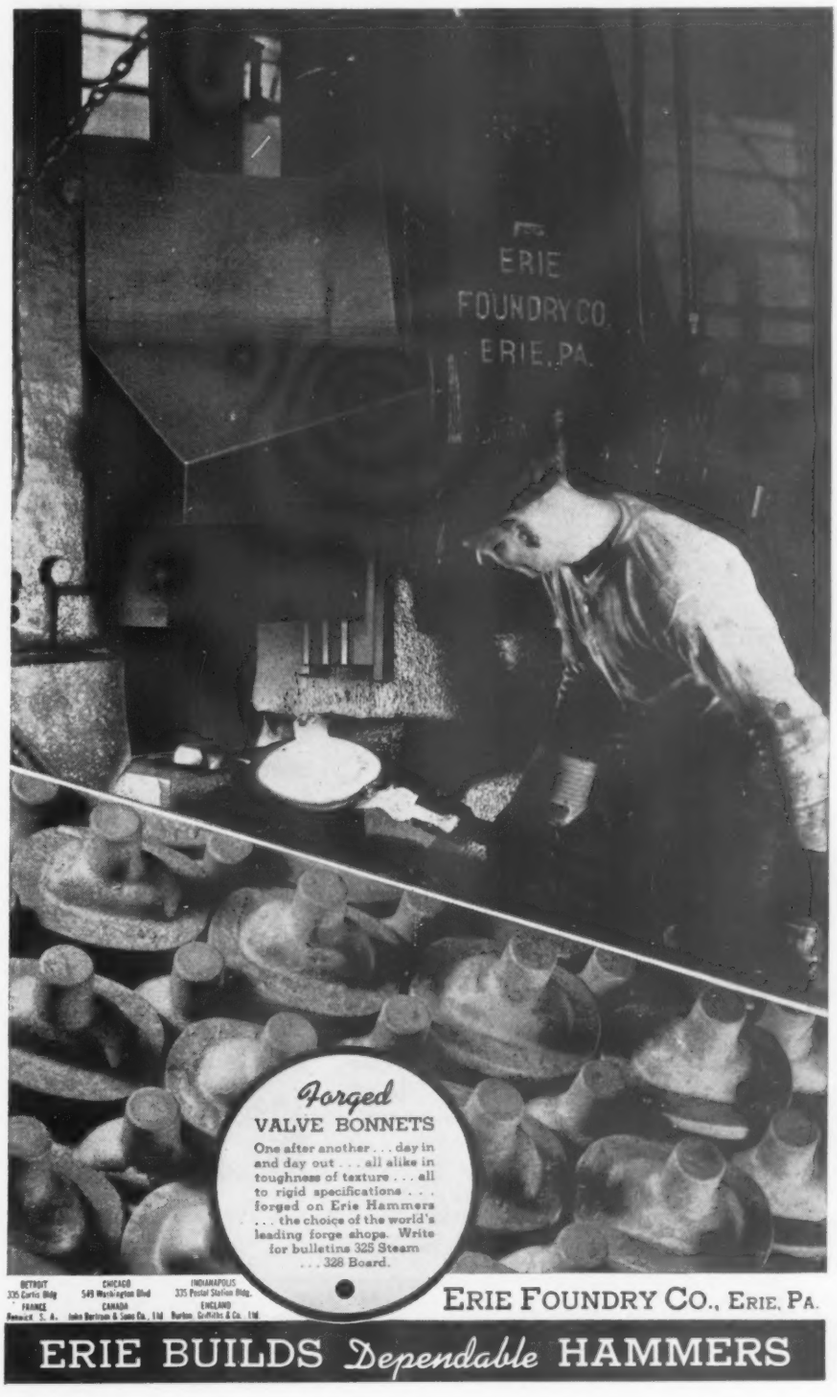
Boston—Small-lot buying of carbon steel, alloy and forging bars has broadened slightly. Jobbers are taking more tonnages to replace stocks. Springfield, Mass., armory has placed a fair tonnage of corrosion-resisting steel, including bars, with Republic Steel Corp., Allegheny-Ludlum Steel Corp. and Timken Roller Bearing Co.

Low bids on 276 tons, hot-rolled nickel steel bars for the Boston navy yard chain-making shops was 4.61c and 4.66c, delivered.

Philadelphia — Bar specifications from automotive partsmakers show further gains, but lack of railroad business is a retarding factor. Activities of machine tool builders are slack, but operations of textile machinery interests are brisk. Jobbers are placing some fill-in tonnages.

New York—Commercial bar buying shows moderate improvement, although still far from active. One of the most encouraging features is the increasing movement out of warehouses, reflecting a diversified gain. Moreover, bolt and nut makers are specifying more freely and automobile accessory manufacturers are laying in greater stocks of plain carbon and cold drawn and alloy bars. Government shops, navy yards and arsenals in particular, continue to specify briskly in these latter items, as is also true of airplane manufacturers, who are operating at a high rate of capacity.

Buffalo—Bar production has been stepped up further by additional gains in demand. Automotive shipments are slightly heavier, but miscellaneous users continue the chief prop to the market. Structural requirements are larger, but railroad buying remains dormant.


ERIE
FOUNDRY CO.
ERIE, PA.
Forged
VALVE BONNETS
One after another . . . day in and day out . . . all alike in toughness of texture . . . all to rigid specifications . . . forged on Erie Hammers . . . the choice of the world's leading forge shops. Write for bulletins 325 Steam . . . 328 Board.
DETROIT 335 Curtis Bldg
CHICAGO 549 Washington Blvd
INDIANAPOLIS 335 Postal Station Bldg.
FRANCE Renault S. A.
CANADA John Bertram & Sons Co., Ltd
ENGLAND Burton Griffiths & Co. Ltd
ERIE FOUNDRY CO., ERIE, PA.
ERIE BUILDS Dependable HAMMERS

Pipe

Pipe Prices, Page 77

Pittsburgh — Pipe business is unchanged, with production steady and prices firm. Most current demand is for oil country goods, although standard pipe is holding up well. Line pipe is quiet, while pressure and mechanical tubing are moving better, aided by automotive demand. Pending housing work gives a better outlook to standard pipe. Boiler tubes continue to move slowly, retarded by absence of railroad buying.

Cleveland — Movement of standard pipe out of jobbers' stock continues to improve, with further gains anticipated the remainder of November. Cast pipe demand is slightly more active, orders including 250 tons of 4 to 8-inch pipe for a Smithfield, O., water distribution system. A similar project for West Mansfield, O., will take 300 tons, bids Nov. 10.

Chicago—Cast pipe demand continues spotty. WPA orders and inquiries are fairly numerous but generally involve less than 50 tons at a time. While some producers report a pickup in bookings of small lots, little change in pending tonnages is reported.

Boston—For building construction, heating and plumbing, demand for steel pipe improves slowly, there being more projects active, although few require large tonnages. Resale prices are steady and generally well maintained. Cast pipe buying is less active, buying including 470 tons for Sanford, Me., and North Stratford, N. H. The district foundry continues a five-day week schedule.

New York — Except for several thousand tons being figured for the Queensbridge and Red Hook housing projects, few large pipe inquiries are pending and the market generally is slow. Oil company demand continues relatively light.

While 1000 tons is pending for an upstate prison water system, cast pipe inquiry is light, with buying confined mostly to small lots. Indications are demand the remainder of the year will be light, although New York city is expected out this month with an inquiry for close to 9000 tons for yard stocks.

San Francisco — Cast iron pipe awards included 342 tons of 18-inch pipe for Pittsburg, Calif., placed with United States Pipe & Foundry Co. Tucson, Ariz., on an inquiry for 1100 tons of 4 to 12-inch pipe, placed the business with transite pipe makers.

Cast Pipe Placed

450 tons, 6 to 12-in., Yakima, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

342 tons, 18-in., Pittsburg, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

300 tons, 16-inch, Sanford, Me., to R. D. Wood & Co., Florence, N. J., through contractor.

250 tons, 4, 6 and 8-inch, new water system, Smithfield, O., to J. B. Clow & Son Co., Cleveland.

170 tons, 10-inch, North Stratford, N. H., to Warren Pipe Co., Everett, Mass.

120 tons, sewage disposal project, Steubenville, O., to J. B. Clow & Son Co., Cleveland.

Cast Pipe Pending

1800 tons, 6 and 8-inch cast iron or asbestos cement pipe; specification 2819, Los Angeles; bids opened.

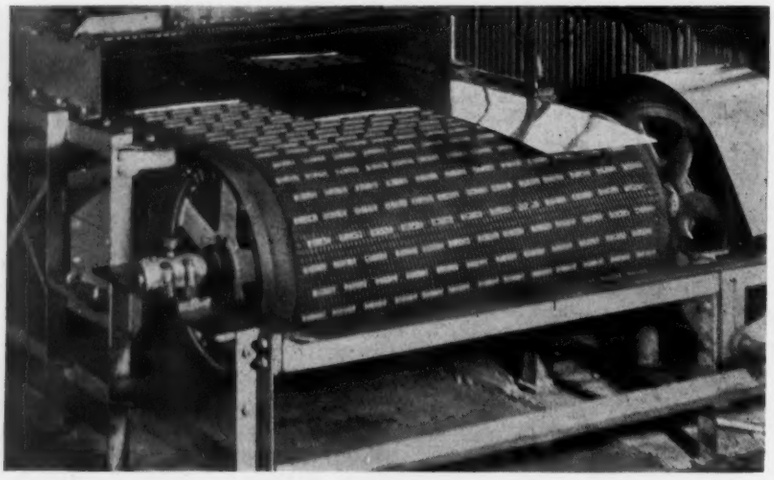
1100 tons, 4 to 16-inch, Tucson, Ariz.; awarded on transite pipe basis.

300 tons, 4, 6 and 8-inch, water works, West Mansfield, O.; bids Nov. 10.

200 tons, mostly 16-inch, Fort Benning, Ga.; bids Nov. 14 to constructing quartermaster.

Unstated tonnage, $150,000 waterworks system, Manawa, Wis.; bond issue voted and application made for PWA grant; J. C. Kinsman, village clerk.

Unstated tonnage, Poynette, Wis., appli-



In Annealing
Rolled Aluminum Sheets

"Cambriloy" Mesh Belts

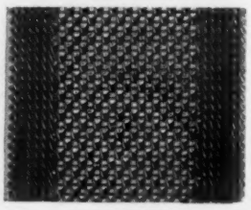
protect your product

. . . . . *cut costs!*

The photograph shows a Cambridge Wire Belt in operation on a W. S. Rockwell Company furnace that has paid dividends in high quality product and economical production. Aluminum cleats prevent the product from contacting the wires of the belt, thus avoiding the danger of product marking.

An exclusive Cambridge time and money saving feature is the Duplex Selvage which assures double strength at the belt's high wear point, guarantees extra hours of service and continuous operating efficiency. The open mesh construction provides low thermal capacity, even heat circulation and fuel economies.

The Cambridge engineer in your territory can help you plan an economical annealing process set-up. Consult him.



Section of "Cambriloy" Mesh Belt showing money-saving Duplex Selvage.

CAMBRIDGE WIRE CLOTH CO.
CAMBRIDGE, MARYLAND
Boston · New York · Baltimore · Pittsburgh · Detroit · Chicago · San Francisco · New Orleans

cation made for federal funds toward construction of $100,000 waterworks system; J. L. Kebaugh, village clerk.

Steel Pipe Pending

Unstated tonnage, 1000 feet, 12-inch i. d. tank plate steel shore pipe, U. S. engineer, Jacksonville, Fla., bids Nov. 7, schedule 155.

Rails, Cars

Track Material Prices, Page 77

Domestic freight car awards in October involved 2537 cars, according to returns just been compiled. Outstanding was the distribution of 2400 freight cars by the Southern railway. October bookings bring the total for the first 10 months up to 12,520, against 51,061 in the corresponding period last year, 39,523 in the same period in 1936 and 9158 for the first 10 months of 1935.

Last month's bookings compared with 1750 in September and represented the second largest monthly total for the year, being exceeded only by the May figure of 6014. Southern Railway purchases in May, as was also the case last month, constituted the great bulk of the business placed.

Further comparisons follow:

	1938	1937	1936	1935
Jan.	25	17,806	2,050	24
Feb.	109	4,972	6,900	806
March....	680	8,155	632	0
April.....	15	9,772	4,427	350
May.....	6,014	4,732	8,900	2
June	1,178	548	5,200	5,151
July.....	0	1,030	7,229	500
Aug.	182	1,475	225	200
Sept.....	1,750	1,216	1,750	875
Oct.....	2,537	1,355	2,210	1,250
10 mos. ..	12,520	51,061	39,523	9,158
Nov.	.....	275	1,550	100
Dec.	.....	275	23,450	10,050
Total		51,611	64,643	19,308

Involved in business as the month closed were 100 flat cars which the Illinois Central will build in its own shops and 30 dump cars placed by the Nevada Consolidated Copper Co.

Chesapeake & Ohio will take bids Nov. 7 on fabricated steel parts for 870 freight cars which will be repaired in its own shops.

Cars Placed

Illinois Central, 100 flat cars, to its own shops in Memphis, Tenn.

Nevada Consolidated Copper Co., 30 dump cars, to Austin-Western Road Machinery Co., Aurora, Ill.

Cars Pending

Navy, 46 cars, with low bidders as follows: Magor Car Corp., Passaic, N. J., thirty-nine 50-ton flat cars for delivery at various points; Greenville Steel Car Co., Greenville, Pa., four box cars for Puget Sound navy yard; Pressed Steel Car Co., Pittsburgh, three 60-ton steel flat cars for Hawaii.

Rails Pending

Mobile & Ohio, 3000 tons 90-pound rail plus fastenings; court authority granted.

Wire

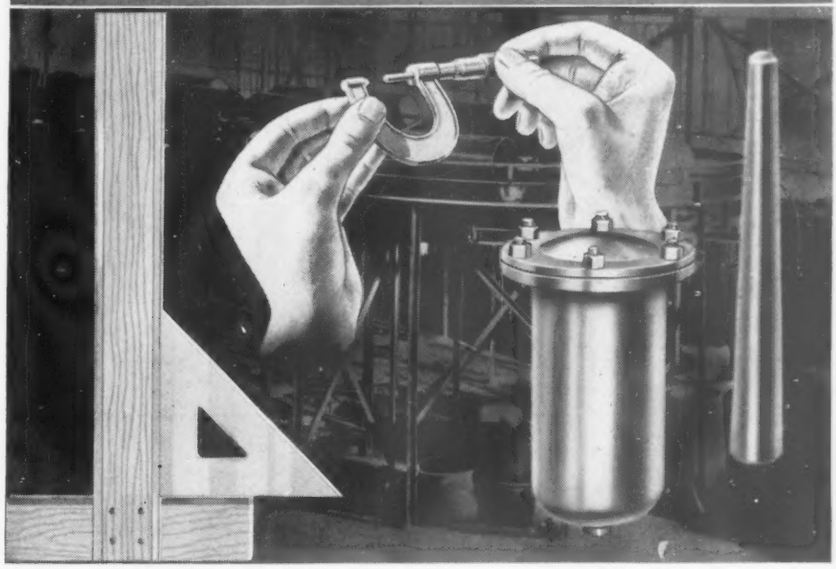
Wire Prices, Page 77

Cleveland—Demand for manufacturers' wire continues to reflect increased activity among local automotive suppliers. This improved demand has offset seasonal easing in requirements for merchant wire items. Mill operations have been improving gradually and still further gains are anticipated through November. Prices for nails and other merchant items have firmed considerably.

Chicago — Bookings of wire and wire products are still tending upward here, with automotive requirements increasing and general demand somewhat stronger. Wire mesh sales have tapered, since the end of the roadbuilding season is near. Slight improvement in farm

DESIGNING · ENGINEERING · MANUFACTURING

DEEP DRAWN SHELLS AND SHAPES



PROFITS ARE BIGGER WHEN Hackney MILWAUKEE SPECIAL SHAPES AND SHELLS ARE USED

You and your customers both benefit when Hackney precision-made shapes and shells are used in your products. You secure the cost and time saving economies made possible by Hackney's more than 35 years of designing and manufacturing experience. And the users of your equipment receive extra durability and dependability.

The Pressed Steel Tank Company pioneered the cold drawing of seamless containers from metal plates. Where welding is desirable, the Hackney method has won recognition for its superiority. The performance records of the millions of Hackney special shapes and containers are your assurance of complete satisfaction.

Utilize Hackney's unique facilities. Let Hackney engineers work with you in developing new shapes or containers to meet your particular problems or in improving the product which you are now using.

Send the details or ask to have an engineer call. There is no obligation; write today.

PRESSED STEEL TANK COMPANY

208 S. La Salle St., Rm. 1211 CHICAGO
688 Roosevelt Building LOS ANGELES
1387 Vanderbilt Concourse Bldg. NEW YORK
1461 S. 66th Street MILWAUKEE

Hackney MILWAUKEE

Containers for Gases, Liquids and Solids

needs for wire is expected to arise shortly, although this source has not accounted very heavily for recent movements.

Boston — Finishing operations in some wire mill departments are near capacity with buying, covering a wide range of wire products, well sustained and heavier in spots. Utilities continue to place considerable volume for repairs. Orders for specialties are more numerous.

New York — Wire buying continues to gain, covering a wide range of products, with manufacturers' wire active. Demand for spring wire is brisk, well sustained buying by the furniture trade being supplemented by heavier specifications from the automobile trade and miscellaneous consumers.

Shapes

Structural Shape Prices, Page 76

New York—Contracts are slightly better than 5000 tons. Three hangars and two buildings, North Beach airport, New York, are the largest awards in the New York area. The number of inquiries are slightly more numerous, mostly public work. A sharp pick-up in government-financed construction during the remainder of the year is indicated. Bridges and grade crossings, bid and pending, are estimated at 2000 tons. Fabricated structural steel prices continue soft.

Pittsburgh—Structural shape activity is gaining slightly. Among the largest of recent awards is 1100 tons for a life insurance company building, Baltimore. An extension to the government's crane runway and structural shop at Portsmouth, Va., will take 3500 tons.

Cleveland — While structural inquiries from private sources still lag, public projects are maintaining fabricating operations here at a fairly active pace. Awards include 400 tons of piling for work in straightening the Cuyahoga river here. A local apartment project will take 2000 tons, with bids expected soon.

Chicago—Despite absence of large structural awards, the market continues active as several major inquiries are pending. Prospective business includes 1600 tons for a Missouri river bridge, Rule, Nebr.; 1250 tons for a bridge at Selma, Ala., and 1000 tons for a local hospital. New inquiries for Texas bridges total more than 2800 tons.

Boston—Additional contracts for small replacement bridges aggregate several hundred tons in addition to 300 tons of stringer and I-beam spans booked by American Bridge Co., Pittsburgh, for Vermont, placed under the regular construction program. More public works projects, notably schools, are up for estimates and bids, but work calling for more than 300 tons per job is limited. Although low on the steel at 4.05c per pound delivered, Phoenix Bridge Co., Phoenixville, Pa., lost the contract for the 414-ton bridge, Farmington, Me., to Lackawanna Steel Construction Co., Buffalo, because of a difference in erection bids, $11,875.50 against $9009. The

Shape Awards Compared

	Tons
Week ended Nov. 5	40,320
Week ended Oct. 29	30,773
Week ended Oct. 22	14,369
This week, 1937	57,885
Weekly average, year, 1937	23,251
Weekly average, 1938	19,960
Weekly average, October	17,160
Total to date, 1937	1,114,064
Total to date, 1938	898,194

Includes awards of 100 tons or more.

Nature's on our payroll

—or she *should* be. Employing the centrifugal force of nature, putting it to work in our foundries, is our method of producing a better casting of Bronze Alloy, Monel Metal, Nickel, Iron, or Semi-Steel.

ROLLS, SLEEVES, LINERS, BUSHINGS, BEARINGS and CASTINGS produced by this method find their way into the "tough spots" all over the world. Perhaps you have a place or a product that would benefit by their application?

It costs you nothing to find out. Write.

SHENANGO-PENN MOLD COMPANY

Plant, Dover, Ohio

Executive Offices: Oliver Bldg., Pittsburgh

Lackawanna shop quoted 4.10c on the steel delivered.

Philadelphia — Considerable tonnage of shapes and bars will be required for five bridges, three of which are vertical lift span and two fixed span, for Cape May county, New Jersey. Several other jobs mostly public are being figured by district fabricators. Prices are weak on fabricated material.

Buffalo — Several fair size jobs are brightening the outlook here. The new convention hall became a certainty with the announcement of a $1,201,090 PWA award to absorb part of the $2,700,000 total cost. The hall will require approximately 2000 tons of structural and 300 tons of reinforcing. Up for bids Nov. 15 is the $1,500,000 Kenmore high school, on which plans call for 1500 tons of structural.

San Francisco — The only large structural award went to Columbia Steel Co. involving 2556 tons of sheet steel piling for the United States Engineer office, San Francisco, for delivery at Welles Harbor, Midway Island. Bids open Nov. 18 for 393 tons for the Umpqua river bridge, Douglas county, Oregon.

Shape Contracts Placed

7500 tons, Netherlands building, 16 stories with two 4-story wings, Rockefeller Center, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through Hegeman Harris Co., New York.

4977 tons, structural steel for three land hangars, North Beach airport, New York, to Bethlehem Steel Co., Bethlehem, Pa., $278,407, bids on steel direct to procurement division, treasury department, New York, pro. 247109, Oct. 31.

3800 tons, structural assembly shop, navy yard, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

3000 tons, building, veterans hospital, Bronx, New York, to American Bridge Co., Pittsburgh; through Wilaka Construction Co., New York.

2655 tons, turret shop and crane runway, navy yard, Philadelphia, to American Bridge Co., Pittsburgh; Hughes Foulkrod Co., Philadelphia, general contractor.

2556 tons, sheet piling, United States Engineer office, San Francisco, for delivery to Welles Harbor, Midway Island, to Columbia Steel Co., San Francisco.

2200 tons, building, No. 4, navy yard, Brooklyn, N. Y., to American Bridge Co., Pittsburgh, through Hudson Contracting Co., New York.

1100 tons, addition to office building, for Monumental Life Insurance Co., Baltimore, to American Bridge Co., Pittsburgh.

1000 tons, superstructure, Queens Bridge housing project, New York, to Simon Holland & Son Inc., Brooklyn, N. Y.; through Cauldwell-Wingate Co., New York.

950 tons, crane runways, navy yard, Charleston, S. C., to Belmont Iron Works, Philadelphia; bids Nov. 2 at $123,777.

875 tons, municipal court building, Washington, to Fort Pitt Bridge Works, Pittsburgh; George Hyman Construction Co., Washington, general contractor, bids Oct. 11.

750 tons, grade crossing elimination, for Pennsylvania railroad, Woodbridge, N. J., to American Bridge Co., Pittsburgh; through James Stewart & Co., New York.

600 tons, state bridge project, RC-4000, Herkimer county, New York, to Phoenix Bridge Co., Philadelphia; through Green Island Construction Co. Inc., Green Island, N. Y., at $126,632.90, bids Oct. 25, Albany, N. Y.

485 tons, penstocks and miscellaneous steel, Brady, Nebr. 225 tons to Lincoln Steel Works, Lincoln, Nebr., and 260 tons to Pittsburgh-Des Moines Steel Co., Pittsburgh.

465 tons, Fleetwood apartments, Yonkers, N. Y., to Claremont Steel & Ornamental Iron Co., New York.

460 tons, Security prison, Mt. Gretna, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

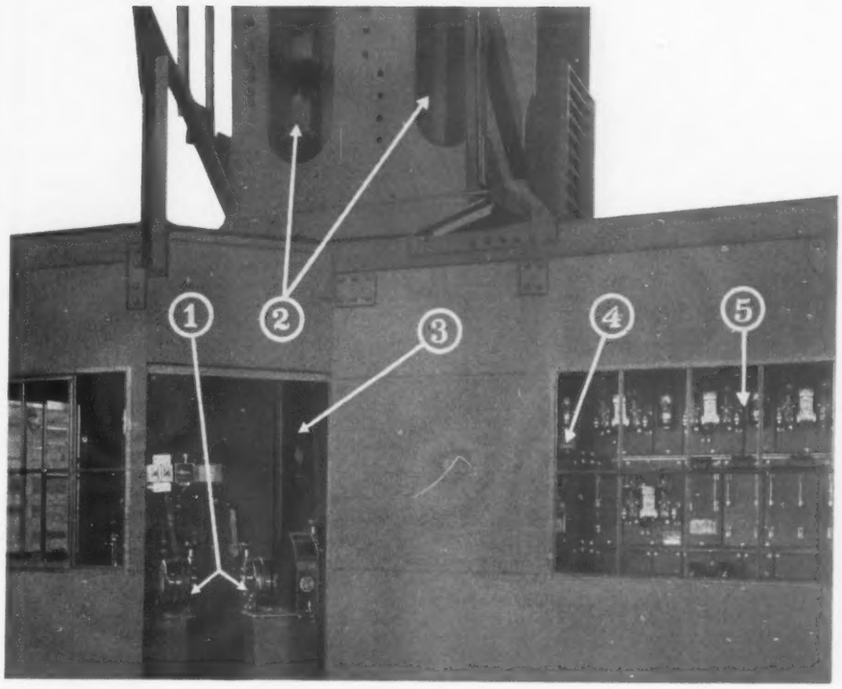
425 tons, steel superstructure, Center bridge, Sandy river, Farmington, Franklin county, Maine, federal aid project 96-C to Lackawanna Steel Construction Corp., Buffalo, N. Y.; bids Oct. 19 to Maine State highway commission, Augusta.

400 tons, sheet piling, Cuyahoga river straightening, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, high school, Coatesville, Pa., to Phoenix Bridge Co., Phoenixville,

Another Installation of

EC&M HEAVY DUTY CRANE CONTROL



•Operator's Cab of Alliance 5-Ton Soaking Pit Crane

1— EC&M Type NT and NX MASTER SWITCHES, because of their compact design and narrow width, permit convenient grouping within easy reach of the operator.

2— EC&M NICKEL ALLOY RESISTORS have high heat-radiating capacity and proven ability to withstand shock and vibration.

3— EC&M LINE-ARC CRANE PROTECTIVE PANEL not only provides individual overload protection for each motor and low voltage protection but, in emergencies, permits a convenient means of simultaneously stopping all motions of the crane by merely pressing the stop button.

4— EC&M WRIGHT DYNAMIC LOWERING CIRCUIT HOIST CONTROLLER guarantees More Trips per Minute with Less Power Consumption.

5— EC&M patented DUPLEX BRIDGE CONTROLLER insures equal distribution of the load on both motors during starting and acceleration as well as during running.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS

When buying Cranes, Specify EC&M Control

Behind the Scenes with STEEL

Feathered Friends

■ If you have any fighting cocks at home, we'd like to introduce you to a friend of ours down in Fostoria, Ohio. Owen Rinebold is his name and he has a hobby that merits an airing on Hobby Lobby. Mr. Rinebold makes gaffs for fighting cocks and he says it is a deep dark secret what steel is used. These spurs must be light in weight but capable of withstanding a severe strain because a cock will strike as much as a 100 lb. blow. Some craftsmen claim they use a silver steel from Scotland, others a special Swedish steel. Some domestic company is missing a bet not to go after this business. Think of the swell adv. they could run showing a pair of ferocious birds gashing each other with Rinebold spurs amid a roaring crowd in some dimly lighted barn—the whole thing topped off with a headline: *Steel That Stands The Gaff!*

Getting Places

■ Editor Kreutzberg's funny bone was tickled last week by American Manganese Steel's *Amsco Bulletin* and the story of Rastus telling his friend Mose: "Ah's sure advanced in de pas' couple ob years". "How's dat?", asks Mose. "Well," says Rastus, "Two years ago ah was called a good fur nothin' lazy loafer, but now ah's listed as an unfortunate victim ob de unemployment sitcheeayshun".

Exiding News

■ The October *Exide News* carries a story of that old Irishman, Pat. Pending. The original Pat. dates clear back to 1641 when the Colony of Massachusetts Bay issued him to Samuel Winslow. Since then, Pat. has had over two million children and he continues to be very prolific, even to the point where a movement is underway to force some sort of birth control on Pat. After looking over some of the more eccentric Pat. Pending, Jrs. on file down in Washington, we think maybe Pat. and Margaret Sanger should get together at that. Such things as rose colored glasses for chickens (No. 730,916) and a self-tipping derby hat (No. 656,248) make Rube Goldberg's contraptions seem conservative, practical and relatively sane.

Hungary?

■ And in looking over some other house organs we were stopped by a headline in Lukens Steel's *Clad News: Water, Water, Everywhere . . . But Not a Rusty Drop.* Sort of reminded us of our pet 6th. grade joke about the traveler who was surrounded by Turkey without a thing to eat.

Another Scoop

■ If you are at all interested in stainless steel consumption or fabrication, don't overlook the very interesting story up forward which reveals a market of 17,400 tons for hospital equipment. This is just one more of STEEL's exclusive feature stories analyzing trends in important steel consuming industries.

Pass It Along

■ Nothing that we know of so delights the hardworking Readers Service Dept. as an innocent request such as came in last week from a Milwaukee subscriber. *"We desire to pass the publication through the organization but in a systematic way. Can you furnish us with readers routing slips?"* The RSD literally drools over such a thing as that. Can we, they shout, and the whole crew springs into action. If you have someway or other escaped this super service for regular readers don't hesitate a second longer.

Ask Us

■ Do you know the difference between a hormone and a corpuscle?

—SHRDLU

Pa.; John McShain, Inc., Philadelphia, general contractor.

300 tons, Reconstruction Transit commission bridges, Bronx, N. Y., to Phoenix Bridge Co., Philadelphia; through Green Island Construction Co. Inc., Green Island, N. Y.

265 tons, Case structure, Trenton, Mich., to Whitehead & Kales Co., Detroit.

260 tons, prison walls, Greenhaven, N. Y., to Bethlehem Contracting Co., Bethlehem, Pa.

235 tons, national dairy products building, world's fair, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

235 tons, bridge, Tonnelle avenue, Jersey City, N. J., to American Bridge Co., Pittsburgh; through J. B. Burns, Dumont, N. J.

230 tons, addition, Bridgeport Brass Co., Bridgeport, Conn., to Fort Pitt Bridge Works, Pittsburgh, Edward E. Bray Co., Bridgeport, general contractor.

215 tons, adult building, hospital, Lockport, N. Y., to Ernst Iron Works, Buffalo.

215 tons, bridge FAP-158, Hemphill county, Texas, to Austin Bros., Dallas, Tex.

200 tons, state bridges, Lyden-Buckland, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Kelleher Corp., Turner Falls, Mass., general contractor.

200 tons, Igloo Carrier Corp. building, World's fair, New York, to Bethlehem Fabricators Inc., New York; through Thompson-Starrett Co., New York.

200 tons, polymer finishing and storage building, for E. I. Du Pont, Carney's Point, N. J., to Belmont Iron Works, Eddystone, Pa.

200 tons, reclamation bureau fish hatchery project, Rock Island dam, Wash., to unstated interest; Kern & Kibbe, Portland, general contractor.

200 tons, state bridge, Grand Rapids, Mich., to Wisconsin Bridge & Iron Co., Milwaukee.

195 tons, structural steel for building between hangars 1 and 3 and pumping station, North Beach airport, New York, to Dreier Structural Steel Co., New York, bids on steel direct to procurement division, treasury department, New York, pro. 247110, Oct. 31.

185 tons, bridge, Grand Rapids, Mich., to Wisconsin Bridge Co., Milwaukee.

185 tons, addition, Ortlieb Brewing Co., Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

160 tons, dormitory, Purdue university, Lafayette, Ind., to E. J. Baker & Co., Chicago.

160 tons, 175-foot truss span, Durango, Colo., to Kansas City Structural Steel Co., Kansas City, Mo.

145 tons, hangar No. 6, Buffalo airport, Buffalo, N. Y., to August Feine & Sons Co., Buffalo.

140 tons, two 50-foot span beam bridge, Williamstown, Mass., to American Bridge Co., Pittsburgh.

140 tons, police station, 306 West 54th street, New York, to Belmont Iron Works, Eddystone, Pa., through procurement division, treasury department, New York.

140 tons, tunnel bracing, Conches dam, New Mexico, to Lakeside Bridge Works, Milwaukee.

135 tons, high school, Ridgefield, Conn., to Westchester Steel Products Co., Yonkers, N. Y.

135 tons, two state bridges over Delaware, Lackawanna & Western railroad, Phillisburg, N. J., to Easton Steel Structures Inc., Easton, Pa.

125 tons, highway maintenance building, Towanda, Pa., to American Bridge Co., Pittsburgh.

125 tons, shapes and bars, 125-man barracks, Fort Monmouth, N. J., to Park Steel & Iron Co., Brighton Beach, N. J., and Taylor-Davis Co., Philadelphia; Eastern Construction Co., Trenton, N. J., general contractor.

125 tons, addition, hospital, Cambridge, Mass., to West End Iron Works, Cambridge.

122 tons, state bridges, plate girder and beam spans, Bradford, Vt. and West Windsor, Vt., to American Bridge Co., Pittsburgh; O. A. Miller Co. Inc., Ludlow, Mass., and Lockwood-Young Corp., Concord, N. H., contractors, respectively.

110 tons, maintenance building, Wilkes-Barre, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

110 tons, bridge FA-391, Bath county, Virginia, to Virginia Bridge Co., Roanoke, Va.

105 tons, department of highways garage, Gettysburg, Pa., to Macomber Steel Co., Philadelphia.

100 tons, shapes and bars, bridge, Chelsea, Vt., to American Bridge Co., Pittsburgh, and Joseph T. Ryerson & Son Inc., Boston; Edward L. Knight, South Royalton, Vt., general contractor.

100 tons, school, Presque Isle, Me., to Lyons Iron Works, Manchester, N. H.

100 tons, Billings bridge, Paris, Me., to Bethlehem Steel Co., Bethlehem, Pa.; Hector J. Cyr Co., Inc., Waterville, Me., general contractor.

Shape Contracts Pending

3500 tons, structural shop and crane runway, Norfolk, Va., navy yard; bids Nov. 16. bureau of yards and docks, navy department, Washington.

2500 tons, state bridge over Missouri river, Rulo, Nebr.

2000 tons, Ambler park apartment, Cleveland; bids soon.

1700 tons, superstructure, Meeker avenue bridge, Newton Creek, Brooklyn; bids Nov. 15, to department of public works.

1575 tons, Oceanic bridge, Rumson, N. J.; bids Nov. 25, county project.

1500 tons, new high school, Kenmore, N. Y.; bids Nov. 15.

1250 tons, bridge, Selma, Ala.

853 tons, bridge, San Felipe, Tex.

850 tons, post office annex, Providence, R. I.; George A. Fuller Co., Boston, general contractor; bids Oct. 28.

835 tons, bridge, Rosewell, N. Mex.

700 tons, state bridge over Tanner's creek, Dearborn county, Indiana.

690 tons, bridge, Brazos, Tex.

675 tons, structural angles and tees, bureau of supplies and accounts, navy department, schedule 4761, bids in Nov. 1, Washington.

550 tons, government survey vessel; Lake Washington shipyards, Seattle, general contractor.

450 tons, bridge, Luling, Tex.

410 tons, field house, for Utah State Agriculture college, Logan, Utah.

400 tons, state grade separation, Klamath Falls, Oreg.; bids at Portland, Nov. 17-18.

400 tons, fourth unit, junior-senior high school, Wauwatosa, Wis., for board of education.

400 tons, state viaduct, Forty-eighth street, Lincoln, Nebr.

400 tons, city hall, Hagerstown, Md.

393 tons, Umpqua river bridge, Douglas county, Oregon, for state; bids Nov. 18.

368 tons, state bridge Lewis river, Wash.; bids in at Olympia Nov. 1.

365 tons, swing span bridge, Gardiner-Randolph, Me., including 175 tons, structural steel; 170 tons, steel sheet piling and 20 tons, movable span machinery, PWA project No. Maine 1096-27F, bids Nov. 16, state highway commission, Max L. Wilder Augusta, bridge engineer.

325 tons, approach, George Washington bridge, through Highbridge Park, New York; Wood & Hagen, New York, low on general contract, bids Nov. 1, Port of New York authority, contract HRB-35.

300 tons, municipal garage, department of sanitation, Washington; bids Nov. 8.

300 tons, furniture storage and crating warehouse, Ft. Myers, Va., for war department.

300 tons, housing project, Syracuse, N. Y.; bids Nov. 12.

300 tons, new high school, Winchester, N. Y.; bids Nov. 22.

252 tons, state bridges, Vermont; D. E. O'Brien Construction Co., Whitehall, N. Y., low Shoreham, 77 tons; Edward L. Knight, South Royalton, Vt., Chelsea, 6 tons; Lockwood-Young Corp., Concord, N. H., West Windsor, 54 tons; Ryan & Densmore, Claremont, N. H., Belvidere, bids Oct. 21, Montpelier.

200 tons, building for Y. M. C. A., Terre Haute, Ind.

200 tons, rural school, Tonawanda, N. Y.; bids Nov. 17.

200 tons, office and garage, for Central Greyhound Lines, Cleveland.

171 tons, Verudgo Wash outlet bridge, United States engineer office, Los Angeles, proposal 178; bids Nov. 7.

160 tons, state highway bridge, Bradley, Mich.

150 tons, incinerator building, Wilmington, Del.; J. A. Bader Co., Wilmington, low.

FOR sustained precision and wear resistance the vital units of American Lathes—such as the compensating cross feed nuts, the compound rest nuts, the threading dial worm wheels—are regularly made of Ampco Metal.

Machine tool builders find Ampco Metal invaluable in meeting high standards of construction and performance. For the complete facts send for "Ampco Metal—Its Uses in Modern Industry."

AMPCO METAL, INC., Dept. S-11-7, Milwaukee, Wis.

In some one of its six grades Ampco Metal can very probably solve a problem for you . . . why not check with us.

The book "Ampco Metal—Its Uses in Modern Industry" will interest you; write for a copy.

AMPCO METAL

"The Metal without an Equal"

BEFORE YOU SPECIFY . . . INVESTIGATE AMPCO

150 tons, apartment, Raleigh Corp., Atlantic City, N. J.; bids Nov. 15.

150 tons, grade separation bridge, Lombard, Ill., for Chicago Great Western railroad.

135 tons, bridges, Shelburne Falls, Mass.

130 tons, state bridge 5739, Watson, Minn.

125 tons high school, Franklin, N. H.

125 tons, parish house, for Dutch Reformed church, Albany, N. Y.

116 tons, Shipley bridge, Clackamas county, Oregon; bids Nov. 17.

103 tons, Princeton bridge, Princeton-Indian township, Me., PWA project No. Maine 1096-26F; bids Nov. 16, state highway commission, Max L. Wilder, Augusta, bridge engineer.

100 tons, school, Wellsville, N. Y.; bids in.

Reinforcing

Reinforcing Bar Prices, Page 77

New York — With award of 5000 tons for Queens Bridge housing superstructure equally to two distributors, reinforcing bar tonnage is down to the lowest point in several weeks. New inquiry is light and pending volume is under 4000 tons. Highway reinforcing needs, however, are again mounting with close to 850 tons for New York state closing at Albany Nov. 15, making close to 2800 tons pending in the East. Bar prices are still easy. Awards include 650 tons for the North Beach airport, New York.

Pittsburgh — Reinforcing awards are fairly numerous, although new projects have slowed up somewhat. The price situation has quieted with the mill prices apparently firm.

Cleveland — While a number of schools are to come up for bids shortly, reinforcing bar work currently is scarce. Disappointing demand from private builders clouds the outlook. Fabricated prices are weakened by the small volume of business.

Chicago—While pending business in concrete bars is increasing, inquiries are almost entirely for small lots. Distributors are busy with plans for jobs involving less than 100 tons and look for the appearance of several larger projects in the near future. Larger bookings have tended to steady prices somewhat.

Boston — Active reinforcing steel inquiry aggregates 2500 tons, including 500 tons, post office annex, Providence, R. I.; sewer, Medford, Mass., and a federal jail, Danbury, Conn., for which general contracts have been placed. Small-lot buying and inquiries are more numerous, notably for bridges and public work. Maine closes Nov. 16 on bridges taking several hundred tons.

Philadelphia — Sweets Steel Co., Philadelphia, was awarded 1120 tons of reinforcing and Bethlehem Steel Co., Bethlehem, Pa., 460 tons of structurals for the Security prison, Mt. Gretna, Pa. Fabricators are estimating a number of jobs due for bids this month, but few involve more than 200 tons. First bar requirements for the Harrisburg-Pittsburgh super highway, will be placed shortly. Prices remain soft.

Buffalo — Activity is sustained at a fairly good pace. The aggregate tonnage reaches the best level of the current year, as a few jobs calling for moderate tonnage are scattered among numerous small projects. Buffalo's new convention hall, recently approved, and now in the hands of architects will call for approximately 300 tons.

Reinforcing Steel Awards

5000 tons, superstructure, Queens Bridge housing projects, New York, to Seaboard Steel Products Corp., New York, and Fireproof Products Co., New York, divided equally; Corbetta Construction Co., New York, sub-contractor, under Cauldwell-Wingate Co., New York, general contractor.

1120 tons, Security prison, Mt. Gretna, Pa., to Sweets Steel Co., Philadelphia.

600 tons, storehouse addition, specification 8911, Eleventh naval district, San Diego, Calif., to unnamed interest.

500 tons, North Beach airport, New York, to Igoe Bros., Newark, N. J.; through procurement division, treasury department, New York.

490 tons, industrial school for boys, White Hill, Pa., to Sweets Steel Co., Williamsport, Pa., through John McShain Inc., Philadelphia, contractor.

380 tons, hospital and power plant addition, Washtenaw county, Ypsilanti, Mich., to Joseph T. Ryerson & Son Inc., Chicago; United Fireproofing Co., Chicago, contractor.

300 tons, mesh, highway project RC-3994, Dutchess county, New York, to Wickwire Spencer Steel Co., New York; Ottaviano & McDonald Inc., Croton-on-Hudson, N. Y., general con-

Concrete Bars Compared

	Tons
Week ended Nov. 5	11,828
Week ended Oct. 29	6,555
Week ended Oct. 22	7,522
This week, 1937	12,137
Weekly average, year, 1937	6,061
Weekly average, 1938	6,646
Weekly average, October	6,990
Total to date, 1937	285,730
Total to date, 1938	299,071

Includes awards of 100 tons or more.

· CLOSE TOLERANCE ·

TWO new close tolerance thread specifications, recently developed by Erie engineers, are described in our new catalog. Proving of course, that Erie's 25 years experience in dealing with special alloys for special requirements enable us to meet close tolerances to help minimize such failures as seizure under high temperature operations. Put your requirement up to us and be assured of accuracy.

ERIE BOLT & NUT CO.

1335 LIBERTY ST. ERIE, PENNSYLVANIA

tractor, $205,028.40, bids Oct. 11, Albany.

280 tons, MacKenzie high school, Detroit, to Youngstown Sheet & Tube Co., Youngstown, O., through McRae Steel Co., Detroit.

225 tons, building, Norge Co., Kalamazoo, Mich., to Calumet Steel Co., Chicago.

200 tons, grade crossing, Erie railroad, Allendale, N. J. and viaduct, Hoboken, N. J., to Truscon Steel Co., Youngstown, O.; through George M. Brewster & Son, Bogota, N. J.

180 tons, municipal court house, Washington, to American Steel Engineering Co., Philadelphia; George Hyman Construction Co., Washington, general contractor.

175 tons, building 131, navy yard, Boston, to Bethlehem Steel Co., Bethlehem, Pa.

174 tons, bureau of reclamation, invitation 48,151-A, Corbett, Wyo., to Sheffield Steel Corp., Kansas City.

164 tons, Ala Moana bridge, Honolulu, T. H., to Bethlehem Steel Co., Los Angeles.

159 tons, high school, Corcoran, Calif., to Kyle & Co., Fresno, Calif.

158 tons, addition, Chamber of Commerce building, Houston, Tex., to Alamo Steel Co., San Antonio, Tex.; through W. S. Bellows Construction Co., Houston.

154 tons, state highway project 118 A and 118 B, Scarboro, Me., to Bethlehem Steel Co., Bethlehem, Pa., through Bancroft & Martin; Lane Construction Co., contractor.

150 tons, school, Oildale, Calif., to unnamed interest.

130 tons, building, Montgomery Ward Co., Detroit, to Concrete Steel Fireproofing Co., Detroit; O. W. Burke Co., Detroit, contractor.

129 tons, highway work, Cochise county, Arizona, for state, to Columbia Steel Co., San Francisco.

114 tons, two bridges, Riverside county, California, for state, to unnamed interest.

112 tons, over-crossing near Saugas, Los Angeles county, California, for state, to unnamed interest.

111 tons, bridge, route 6 section 8B, Clifton, N. J., to Joseph T Ryerson & Son Co., Chicago; through Franklin Construction Co., Newark, N. J.

109 tons, bridge near Fillmore, Los Angeles county, California, for state, to unnamed interest.

105 tons, buildings, veterans' hospital, Muskogee, Okla., to Ceco Steel Products Co., Oklahoma City, Okla.; Manhattan Construction Co., Muskogee, Okla., general contractor.

105 tons, trade school, New Britain, Conn., to Topper & Griggs, Hartford, Bethlehem Steel Co., Bethlehem, Pa., to furnish bars; Fusco & Amatruda, New Haven, Conn., general contractor.

104 tons, improvements for Turlock Irrigation district, Turlock, Calif., to Kyle & Co., Fresno, Calif.

100 tons, grade separation, Lantz avenue and Grand Trunk Western railroad, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.; Jutton-Kelly Co., contractor.

100 tons, adults building, addition to Niagara county sanitarium, Lockport, N. Y., to Joseph T. Ryerson & Son, Inc., Buffalo.

100 tons, state hospital buildings, Booneville, Ark., to Laclede Steel Co., St. Louis; J. H. Leveck & Co., Little Rock, Ark., general contractor.

100 tons, round and square, deformed, shop formed, Huntington, W. Va., supply depot, U. S. engineer, that station, to Carnegie-Illinois Steel Corp., Pittsburgh, 1.903c, discount ½ per cent; bids Oct. 21, schedule 516-39-82.

Unstated tonnage, library, Concord, N. H., to Northern Steel Co., Boston; through E. J. Pinney Co. Inc., Springfield, Mass.

Reinforcing Steel Pending

750 tons, federal jail, Danbury, Conn.; bids postponed to Nov. 10.

550 tons, Oceanic bridge, Rumson, N. J.; bids Nov. 25, also 117,000 linear feet reinforcing trusses.

500 tons, post office annex, Providence, R. I.; George A. Fuller Co., Boston, general contractor; bids Oct. 28.

500 tons, approach, George Washington bridge, through Highbridge park, New York; Wood & Hagen, New York, low, bids Oct. 31, Port of New York authority, contract HRB-35.

400 tons, additional span, south end, Key bridge, project 6A4, National Capital Parks, Arlington county, Virginia; bids Nov. 22, bureau of public roads, department of agriculture, Washington.

390 tons, mostly mesh, highway project, Wayne county, New York; bids Nov. 15, Albany.

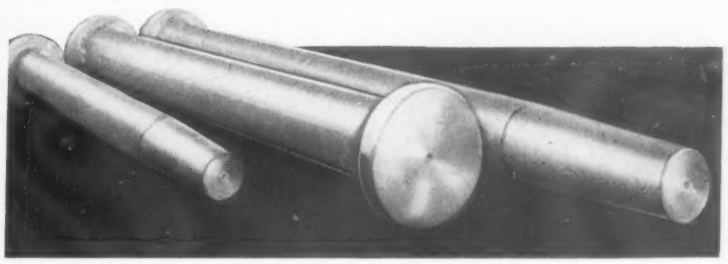
300 tons, Grand river dam authority, Oklahoma.

300 tons, housing project, Syracuse, N. Y.; bids Nov. 12.

300 tons, high school, Kenmore, N. Y.; bids Nov. 15.

280 tons, mesh, highway project, Sullivan

Specify "STANDARD" for Quality



Ship Tail and line Shafts

Dependable quality is seldom fresh born. It nearly always goes back to the painstaking research by a company striving for perfection and to the knowledge that is gained from the experience of mistakes and victories.

Back of us are many years of research, engineering and experience that have resulted in a continued advancement in the quality of "Standard" products. We solicit your use of the facilities offered by this company.

CASTINGS • FORGINGS • WELDLESS RINGS
WROUGHT STEEL WHEELS

BRAND

STANDARD Steel Works COMPANY

BURNHAM, MIFFLIN CO., PENNA.
District Offices
New York · Philadelphia · Chicago · San Francisco
Portland, O. · St. Louis

USE
MOORE RAPID
Lectromelt
FURNACES
for
MELTING
REFINING
SMELTING

Alloy and Carbon Steels.
Gray and Malleable Irons.
Copper, Nickel and Alloys.
Ferro-Alloys, Carbide.
Special Products.

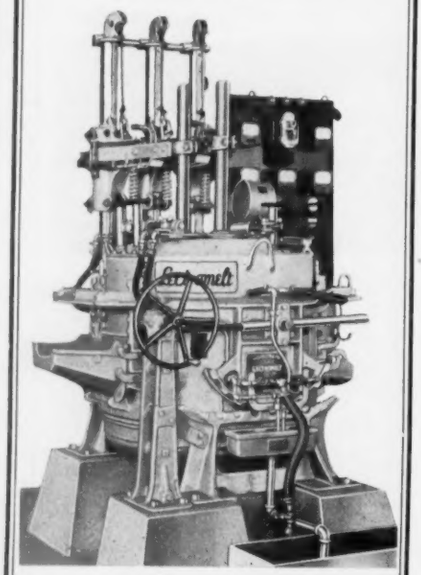


Illustration shows new 500 pound capacity 3 phase direct arc LECTROMELT furnace installed in jobbing steel foundry.

RAPID
ECONOMICAL
RUGGED

BUILT IN STANDARD SIZES
25 LBS. TO 50 TONS CAPACITY

PITTSBURGH
LECTROMELT
FURNACE
CORP.
PITTSBURGH, PA.

county, New York; bids Nov. 15, Albany.
263 tons, bureau of reclamation, invitation A-38,184-A, Odair, Wash.; bids Nov. 8.
200 tons, buildings, Aberdeen, Md., proving ground; bids Nov. 6.
197 tons, road work, Camden, N. J.; F. A. Canuso & Sons, Camden, low.
190 tons, boys' club, Detroit.
175 tons, mesh, highway project, Rockland county, New York; bids Nov. 15, Albany.
170 tons, mesh, highway, route 28, section 31, Camden county, New Jersey; Francis A. Canuso & Sons, Philadelphia, general contractor.
170 tons, incinerator, Cincinnati.
150 tons, addition, South Philadelphia Provision Co., Philadelphia; bids in.
125 tons, laundry building, Annapolis navy departments; bids Nov. 16.
113 tons, rivet bar steel, schedule 4735, Washington, for Mare Island, Calif.; bids Nov. 15.
110 tons, grade separation, Davison avenue at Grand Trunk railroad, Detroit.
100 tons, barrack, Carlisle, Pa.; bids Nov. 19.
100 tons, chemistry laboratory building, Canisius college, Buffalo; bids in.

Pig Iron

Pig Iron Prices, Page 78

Pittsburgh — Pig iron is more active, foundry consumers taking more tonnage. October shipments showed a good increase over September, while November promises to be the best month of the year. Blast furnace operations are the best for 1938 to date, 18 of the district's 50 stacks being active. Further improvement in steelmaking is expected to call for an increase in iron requirements, with possible addition of more blast furnaces.

Cleveland—Pig iron sellers note a decided improvement in releases lately as automotive foundries increase operations. Further gains are anticipated from this source through November. Jobbing foundries are also experiencing a moderate bulge in activity. Demand from heating equipment foundries continues to expand seasonally. Shipments through November are expected to record a gain of approximately 10 per cent over the October level. Prices are firm.

Chicago — While heavy contracts for fourth quarter shipment were entered prior to the opening of this period, some new business in pig iron at $21 is reported. With foundry melt improving, it is not improbable that sales this quarter will be larger than was anticipated at the time the price advance ended a buying flurry. A further increase in shipments this month is looked for.

Boston — Pig iron consumption is increasing slowly, with stove foundries making the best showing. Although still light, new business is slightly more active from jobbing plants and small foundries operating with light stocks. Shipments are well in excess of new buying because of prior coverage by larger users.

New York—Pig iron consumption in this district is gradually expanding, but this is reflected far more in releases against old contracts than in new buying. New orders have been exceedingly light for the past few weeks, due to previous covering. While fair export demand is pending, actual buying is small.

Philadelphia — Improved shipments are reflected in better operations of foundries. A large machinery maker already has taken out several hundred tons bought prior to the recent price advance, a typical trend among large users. An independent merchant stack is expected to go in the first of the year.

Buffalo — Pig iron shipments hold around the best level in 12 months, with further gains in prospect. Best demand lately has been from automotive melters. Needs of heavy industries continue to lag, but inquiries elsewhere indicate expanding activity. Little new buying has appeared, with most leading consumers covered for the remainder of the year.

Cincinnati — Deliveries continue at the improved level attained last month, but additional increases are looked for. Demand for automotive and heating equipment castings predominates, with jobbing business tending to lag.

St. Louis — Pig iron shipments continue to expand, October movement having been the largest of the year. The melt has improved further, mills, jobbing foundries and specialty shops showing gains.

Birmingham, Ala. — Pig iron output is almost at capacity in the Birmingham district, including Gadsden, with 16 out of a total of 18 blast furnaces in production.

Toronto, Ont. — Spot demand is slightly heavier. The melt holds around 60 per cent, with a higher rate in prospect shortly. Pig iron production is heavier, five blast furnaces being active, against four a month ago.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 77

Bolt and nut production continues to expand, operations being estimated at nearly 40 per cent. A further increase is looked for during November. Government spending in connection with various public projects is responsible for a substantial portion of current demand for bolts, nuts and rivets. Outstanding among direct inquiries from the government is more than 400 tons

of bolts and nuts, including a small amount of rivets, for Philadelphia navy yard, bids Nov. 15. Automotive needs account for a large share of recent business, with farm equipment demand expanding moderately. Railroad buying remains dull.

Scrap

Scrap Prices, Page 80

Pittsburgh — Scrap continues dull here despite better activity in other districts, but the market is stronger than during the preceding two weeks. Small sales of No. 1 steel have been made at $14.50, but since a good part of this business was on averaging contracts, the price is not necessarily a true indication of the local market.

Cleveland — Scrap trading is dull, most movement being shipments on contracts, largely to other consuming centers. Most activity is in heavier grades rather than specialties or lighter grades. Prices here and at Youngstown are unchanged.

Chicago—Heavy melting steel is up 50 cents a ton on a sale of 25,000 tons to a local consumer at $14. Brokers are asking $13 for No. 1 busheling, $13.25 for alloy-free automotive heavy melting and $13.25 for factory compressed sheets. Dealers have tightened up on releases from yards as the stronger undertone in the market points to further price advances.

New York—Increase in steelmaking operations in the East has not resulted in a corresponding gain in scrap buying as most mills continue to buy in small lots and are taking shipments against old orders conservatively. One result has been few price changes in view of the lack of tonnage transactions. Prices are steady and moderately firm, but the expected rise in some quarters has not materialized. Buying by foundry consumers is also limited to small shipments. Boat loading is more active, one broker loading three ships last week for Japan, while additional purchases by that country total 160,000 tons. Little distress material is now appearing for sale in this district.

The scrap cartel will meet in London Nov. 15 to discuss additional purchases. At the October meeting, purchases from Holland and France were authorized but none from the United States. Last European purchases here, involving small lots, were negotiated privately and brought $14.50 and $15, f.a.s., New York, for No. 1 and $1.50 less for No. 2. The Japanese order was at about $15 and $13.50 on shipboard, about $1 over f.a.s. equivalent.

Philadelphia — The market has a stronger undertone, although shipments to one point are held up and no new business of importance has been placed in other directions. Brokers are paying $14.50 for No. 1 steel against domestic contracts, with the next tonnage expected to bring over $15. No. 2 is unchanged. Steelmaking grades find best demand in export buying which still is active at $14 for No. 1 and $13 for No. 2, Port Richmond. Little of the 160,000 tons bought by Japan is expected to move from this area.

Detroit — Prices on recent scrap lists from automobile companies showed no perceptible weakening, which is rather surprising in view of restricted demand from consumers. Dealers apparently prefer to retain supplies, looking for renewed buying to result from the good outlook for a continuation of near-capacity steelmaking the next two months.

Cincinnati — Prices are unchanged, except for an increase in cast scrap. Mills are taking shipments against orders but refrain from new buying despite advances in steelmaking.

St. Louis — Scrap is materially stronger, with prices higher on a number of leading grades. Firmness is due partly to strength at Chicago and other eastern points and to a drying up of offerings from country dealers and industries.

Seattle—Export prices of No. 1 scrap remain steady at $12 and $12.50, with receipts light and tidewater stocks depleted. Japan's purchase allotments from the United States for the last quarter are reported at about 150,000 tons of which most will move from the Atlantic.

Toronto, Ont. — Scrap trading is spotty, confined largely to heavy melting steel and machinery cast. Offerings from the country are declining seasonally, but dealers' yards are well stocked though mostly with inactive grades.

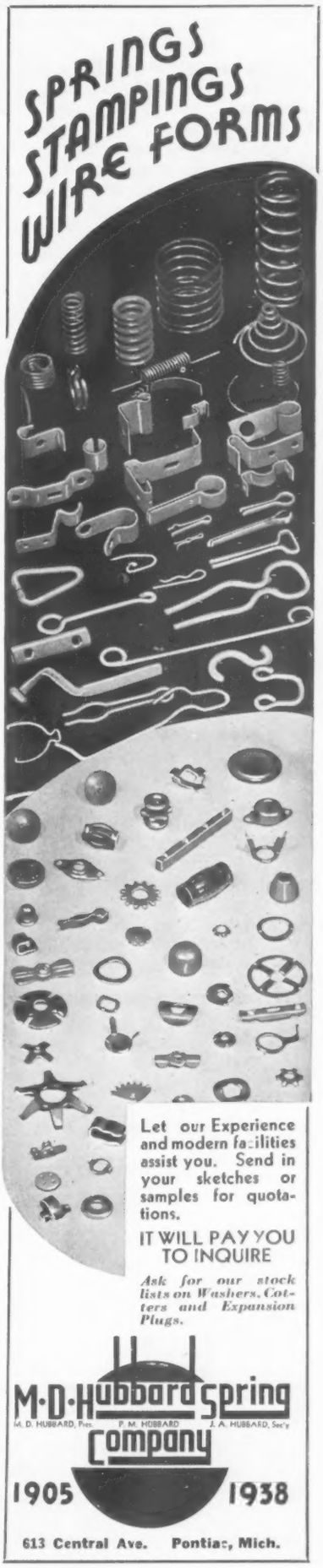
Warehouse

Warehouse Prices, Page 79

Pittsburgh—Sales have increased substantially and prices are firmer. Miscellaneous manufacturers are more active. Wire products are moving better and private building has increased pipe demand from local contractors.

Chicago—Business has leveled off, following a substantial gain in October. An even trend is anticipated until at least the middle of November. Prices are firm.

Boston—Buying from warehouses moves upward gradually, with October gains in number of orders and tonnage, holding. There is some shading by jobbers in the Boston



Let our Experience and modern facilities assist you. Send in your sketches or samples for quotations.

IT WILL PAY YOU TO INQUIRE

Ask for our stock lists on Washers, Cotters and Expansion Plugs.

M·D·Hubbard Spring Company

M. D. HUBBARD, Pres. P. M. HUBBARD J. A. HUBBARD, Sec'y

1905 1938

613 Central Ave. Pontiac, Mich.

district on various products, notably sheets, some sellers passing on to consumers part of the recent reduction in mill prices.

New York — Following the best month of the year, October, warehouse volume continues active with orders more numerous and larger individually. Demand is well diversified with some slight gains in structurals and heavier steels which have been inclined to lag. Prices are fairly steady except for scattered shading.

Philadelphia — Business shows further slight gains but is lagging behind expansioin in mill activity. Prices are somewhat firmer.

Cincinnati—Industrial needs continue to provide most warehouse sales, with the trend close to that of a month ago. Prices are steady.

St. Louis — October business was about 8 per cent ahead of September, with demand more widely diversified than heretofore. Sheets are active, particularly galvanized, but railroad shops are buying on a hand-to-mouth basis.

Iron Ore

Iron Ore Prices, Page 80

Cleveland—Shipments of iron ore from upper lake ports during October amounted to 3,624,416 tons, compared with 3,284,800 tons during September and 3,325,715 tons in August. October shipments represent a decline of 44.8 per cent from the identical month last year. Total shipments to Nov. 1 amounted to 17,781,706 tons, against 61,174,157 tons to Nov. 1, 1937, a decrease of 70.9 per cent.

Shipments for the season to Nov. 1 in 1938 and 1937, as tabulated by the Lake Superior Iron Ore association, follow:

Port	To Nov. 1, 1938	To Nov. 1, 1937
Escanaba	964,237	2,942,402
Marquette	1,018,193	4,898,677
Ashland	2,029,065	5,447,641
Superior	6,385,084	21,696,896
Duluth	3,713,185	16,598,272
Two Harbors	3,671,942	9,590,269
Total	17,781,706	61,174,157

Steel in Europe

Foreign Steel Prices, Page 79

London — (*By Radio*) — Domestic iron and steel prospects in Great Britain are brighter, with semifinished and pig iron stocks down to more normal proportions, except in the case of hematite. New business is still limited but a price policy announcement is expected by the end of the month. Demand from foundries and constructional engineers is expanding. The sheet trade is improving slightly with tin plate demand moderately active.

The Continent finds export trade satisfactory, especially in merchant bars and semifinished steel. Galvanized sheet prices are firmer as American competition is subsiding.

Tin Plate

Tin Plate Prices, Page 76

New York—Announcement of next year's tin plate price is expected momentarily, and meantime buyers are ordering only for early needs. Larger users still have fair stocks. Export demand is only fair and well below the volume a year ago.

Field for Stainless Steel in Hospitals

(*Concluded from Page* 18)

country's hospitals are to be depends to a large extent on business revival. Reductions in endowment incomes and revenues from patients during the depression and recession generally restricted equipment purchasing to minimum es sentials.

Representing a $3,000,000,000 aggregate investment, the hospitals normally spend $150,000,000 annually for new construction, $127,500,000 for apparatus and supplies, $108,450,000 for maintenance materials.

Many now are deficient in equipment and extended business recovery should touch off deferred buying in volume.

Authorities minimize probable effects of proposed socialization of hospitals. Last year's construction added 27,827 beds. Should the 10-year federal program for 50 new hospitals each of 30 to 60 beds materialize, it would increase capacity less than did private construction in 1937.

Nevertheless, the possibility of centralized hospital purchasing under federal control, with fixed equipment standards, is not discounted, and would have obvious effects on material suppliers and equipment makers.

SNOWDEN SAMUEL
President

S. A. COCHRAN
Vice Pres.

FRANK SAMUEL & CO., Inc.
Harrison Bldg., Philadelphia, Pa.

ALLOYS
Ferro Manganese
Ferro Chrome
Ferro Silicon
Calcium Silicide
Silico Manganese

PIG IRON
Low Phos
English
French

MUCK BARS
Low Phos and Special
The American
Swedo Iron Co.'s

MANGANESE ORE
Open Hearth Use
Blast Furnace Use

IRON ORES

CHROME ORE
Lump
Ground

BRANCH OFFICES:
Boston, Mass.
24 Alban Road

New York, N. Y.
40 Exchange Place

Stainless Steel At Bottlers' Show

■ AN IMPRESSIVE and steadily growing consumer of alloy steels is the soft-drink bottling equipment industry, which exhibited machinery valued at $1,000,000 at the American Bottlers of Carbonated Beverages' show and convention in New York, Oct. 31-Nov. 4.

Especially noteworthy is the advance in the use of stainless steel for tanks, and working parts in filling units, with but slightly less progress in labeling, washing and accessory machinery.

Welded stainless steel tanks, with fittings of the same material, for mixing, storage and syruping are in numerous instances replacing steel glass-lined tanks.

A stainless steel tank with chrom-

ium-plated fittings is used by a manufacturer of a cooling carbonator. A water cooling refrigerator has a distributing trough of stainless, outside panels and linings being of the same material.

While washing equipment employs substantial tonnage of steel, comparatively little is alloy or stainless. Some have discharge parts of chromium-nickel steel and outside fittings of chromium plated steel.

Some idea of the many alloys used in saturators, filling, rotary syrupers, and crowning units may be obtained from a list of scores of small and large working parts. Included are: Stainless, nickel silver, hardened chromium-nickel steel, naval bronze, manganese bronze, nickel iron, chromium-molybdenum iron, heat treated chromium-vanadium steel, heat treated chromium-molybdenum steel, manganese steel, aluminum and cast iron. There are others, but the foregoing are practically standard for various parts, selection being made to meet specific needs as to wear, pressure, temperature and resistance to corrosion.

Chute cover crowners for most units are made of cold drawn stainless steel, while other parts of stainless include film plate saturator, tank ball floats, filters, water inlet spray, bottle support plates, plungers, hopper chamber crowners, filling valves, syrupers and wearing plates.

Wide Range of Alloys

Gears, cams and affiliated parts are important elements in the design of bottling equipment, a wide range of alloys being utilized for the units.

Main driving gears are frequently chromium-molybdenum iron; and filler drive gears, nickel iron. A leading manufacturer is using chromium-nickel steel in the head clutch miter gear, with the planetary gear of chromium-molybdenum iron. Drive pinions are generally of heat-treated chromium-vanadium steel, and bottling clamp cams an annealed chromium - molybdenum steel casting. Of heat-treated chromium-molybdenum steel are bottle cylinder pull-down cams, and bevel pinions. The idler gear generally is a manganese steel casting, while the bottle guide pivots are stainless. Hardened chromium - molybdenum steel is often employed for the pump crankshaft, with hardened steel casting for the bottle table ratchet.

Constant progress is being made in design of bottling machines, now practically automatic. A new unit has 20 filling valves, with production speeds of 18 to 60 bottles per minute. The instrument panel shows the operator at a glance the number of bottles per minute being filled, gas pressure, oil pressure in the automatic system, and carbonated water temperature. Crowns are fed from a 26-gross hopper to the crowning heads of the unit by gravity, and are locked over the bottle lips by a flexible throat piece as the crowner heads descend over the bottles. Corrosion-resistant metals are used throughout the crowning part of the mechanism.

Equipment

New York — Machinery orders for one or two tools at a time hold well, most buying by metalworking industries being for replacement with the exception of airplane engine builders, who in some instances are buying for expansion for special work. Several fair-sized lists are up for government shops. Swind Machinery Co., Philadelphia, is low bidder on nine of the 15 metalworking tools for the Washington navy yard shop bid Oct. 25, including six motor-driven wet and dry grinders, two jig boring machines and a universal grinder.

Other lows in this list are Barber-Colman Co., Rockford, Ill., hobbing machine; Pratt & Whitney, Hartford, Conn., precision jig boring machine, $12,478, and Acme Machine Tool Co., Cincinnati, two turret lathes, $20,591.50. Worthington Pump & Machiney Co., Harrison, N. J., has been awarded 16 centrifugal pumps and spares for navy yards at Brooklyn and Philadelphia at $143,566. Bids close Nov. 30 on two 350-ton capacity hammerhead cranes for installation at the Brooklyn and Norfolk, Va., navy yards.

Boston — Slight gains in domestic orders for single tools and foreign order backlogs heavier with some district shops features the machine tool trend. Several shops have increased operations slightly. Domestic demand is well diversified among the metalworking industries with special units leading. Jones & Lamson Machine Co., Springfield, Vt., is low at $16,143.68, on an automatic thread grinder for the Washington navy yard and Reed-Prentice Corp., Worcester, on two heavy-duty lathes for Portsmouth, N. H. Also for the latter shops, Monarch Machine Tool Co., Sidney, O., is low on two engine lathes. For Newport, R. I., Cincinnati Lathe & Tool Co., Cincinnati, will probably get three lathes on a low bid of $9945.

Chicago—Machine tool sales have improved only slightly, but sellers expect November business to be better than October. Present bookings are in small lots, but several large lists are seen in the offing. So far this month inquiries have been spotty, with two good days and two weak ones reported.

Cleveland — October machine tool sales for many dealers were the highest of the year to date. Domestic ordering continues encouraging, not from volume, but from the regularity of orders. During the past week several orders for lathes and other equipment were placed by electrical companies. A fairly large volume of used equipment is on the market and is said to be diverting some new machine orders.

Perforated Metal
INDUSTRIAL
ORNAMENTAL
Any Metal
Any
Perforation
Years of perforating experience has developed a wide selection of patterns and an ability to cope with unusual specifications. Industrial, ornamental, safety or special—H. & K. has the answer.
The Harrington & King
PERFORATING Co.
5634 FILLMORE ST., CHICAGO
114 LIBERTY ST., NEW YORK

Nonferrous Metals

New York — Activity in nonferrous metals settled to a routine and quiet pace last week since consumers' nearby needs are well covered and stimulating news was generally lacking. Indications were that improvement in consumption is slowing down with sheet galvanizing down one point at 64 per cent and tin plate at around 25 per cent. Copper and brass mills, however, stepped up operations to about 60 per cent of capacity.

Copper — Sales were lighter and close to the low for the year but prices held on the basis of 11.25c, Connecticut, for electrolytic. Export copper fluctuated from 11.10c to 11.20c, c.i.f. European ports. The foreign market was fairly active due mostly to speculative liquidation.

Lead — Demand tapered but sales were estimated at about 5000 tons for the week. Prices held at 4.95c, East St. Louis.

Zinc — Consumers continued to show little buying interest but prices held on the basis of 5.05c, East St. Louis, for prime western.

Tin — Trading by importers was still hampered by the unfavorable price relationship between the Singapore and London markets. Prices have been maintained above the 200 level in London due to speculative buying which was stimulated by the buffer pool program. Straits spot closed here at around 46.30c.

Antimony — Prices held unchanged at 12.25c, New York, for American spot in cases and nominally 14.00c, duty paid New York, for Chinese spot. Demand was dull.

Ferroalloys

Ferroalloy Prices, Page 78

New York—Ferromanganese sellers anticipate further improvement in shipments this month, following a 7 to 8 per cent gain in October. The trend in deliveries has been steadily upward the past three months. No change in ferromanganese prices is expected before the middle of December, with a revision at that time also problematical. Domestic spiegeleisen prices are steady, with shipments expanding. Quotations on other leading ferroalloys are unchanged.

Coke Oven By-Products

Coke By-Product Prices, Page 67

New York — Better demand for coke oven by-products at firm prices involves better buying for spot and future shipment. Phenol is substantially more active, notably to the plastic industry. Improvement in refined naphthalene has been slight, due to the season. Buying of toluol and xylol continues to mount with heavy inventories now reduced.

OUR AIM is to render service. A little more complete... more hospitable...more pleasing ... than even the most exacting guest expects.

CHAS. H. LOTT
Manager

Every Room Outside with Private Bath
Single from $2.50
Double from $4.00

DETROIT LELAND HOTEL

CASS AT BAGLEY AVE.
GARAGE IN CONNECTION

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Oct.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
29	11.25	11.37½	10.77½	46.25	46.40	5.10	4.95	5.05	20.00	12.25	35.00
31	11.25	11.37½	10.77½	46.00	46.10	5.10	4.95	5.05	20.00	12.25	35.00
Nov.											
1	11.25	11.37½	10.77½	46.45	46.60	5.10	4.95	5.05	20.00	12.25	35.00
2	11.25	11.37½	10.77½	46.00	46.15	5.10	4.95	5.05	20.00	12.25	35.00
3	11.25	11.37½	10.77½	46.35	46.50	5.10	4.95	5.05	20.00	12.25	35.00
4	11.25	11.37½	10.77½	46.30	46.45	5.10	4.95	5.05	20.00	12.25	35.00

MILL PRODUCTS
F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets
Yellow brass (high) 17.50
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.25
Zinc, 100 lb. base 9.75

Tubes
High, yellow brass 20.25
Seamless copper 19.87½

Rods
High yellow brass 13.37½
Copper, hot rolled 15.87½

Anodes
Copper, untrimmed 16.62½

Wire
Yellow brass (high) 17.75

OLD METALS
Nom. Del. buying prices

No. 1 Composition Red Brass
New York 7.00-7.10
Cleveland 7.50-7.75
Chicago 6.87½-7.12½
St. Louis 7.00-7.25

Heavy Copper and Wire
New York, No. 1 ..... 8.50-8.75
Cleveland, No. 1 ..... 8.50-8.75
Chicago, No. 1 ..... 8.50-8.75
St. Louis 8.50-8.75

Composition Brass Borings
New York 6.10-6.35

Light Copper
New York 7.00-7.25
Cleveland 6.75-7.00
Chicago 6.75-7.00
St. Louis 7.00-7.25

Light Brass
Cleveland 4.00-4.25
Chicago 4.50-4.75
St. Louis 4.50-4.75

Lead
New York 4.00-4.25
Cleveland 4.00-4.25
Chicago 4.00-4.12½
St. Louis 4.00-4.25

Zinc
New York 2.50-2.62½
Cleveland 2.50-2.75
St. Louis 2.75-3.00

Aluminum
Borings, Cleveland 6.50-6.75
Mixed, cast, Cleveland 8.75-9.00
Clips, soft, Cleveland 13.25-13.50
Mixed cast, St. Louis 9.25-9.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads, 11.62½
Standard No. 12 aluminum 13.75-14.25

Construction and Enterprise

Ohio

ASHLAND, O.—City, W. A. Mason, mayor, takes bids due at noon, Nov. 14, for sewage disposal plant improvements (Contract A) costing $36,500. Certified check or bid bond 5 per cent to accompany bid. Will soon advertise for bidding on Contracts B and C to be due, respectively, Dec. 26 and Jan. 23. E. D. Barstow, Akron, O., consulting engineer.

BELLEVUE, O.—New York, Chicago & St. Louis railroad, A. C. Harvey, Terminal tower, Cleveland, chief engineer, plans to build new motor car shop and blacksmith shop to replace structures destroyed by fire at loss of $75,000.

CINCINNATI, O. — Western Bank & Trust Co. is remodeling its banking building and plans to install a complete air-conditioning system. Fosdick & Hilmer, Cincinnati, engineers.

COLUMBUS, O.—Columbus Auto Parts Co., R. E. Klages, president, has let $65,000 contract for constructing one-story, 160 x 220-foot steel forging shop to H. K. Ferguson Co., Hanna building, Cleveland.

COLUMBUS GROVE, O.—Village, E. L. McCrate, mayor, will be ready for bids about Nov. 15 on power plant improvements, including removal and replacement of three boilers, at total cost of $32,571; PWA grant approved. Plans now being prepared. Carl Simon, Van Wert, O., consulting engineer.

DAYTON, O.—Army air corps, materiel division, contracting officer, Wright field, takes bids to 10 a.m., Nov. 15, for six rotation alternator assemblies and six dynamotor assemblies. (Circular 39-322.)

EAST PALESTINE, O. — City, Elmer Dishong, service director, has plans ready and is taking bids due Nov. 19 on construction of a sewage disposal plant to cost $45,455. F. S. Barckhoff, city engineer. (Noted Sept. 19.)

EATON, O.—REA has allotted $237,000 grant to joint owners, Darke County Rural Electric Co-operative Inc., Greenville, O., and Butler County Rural Co-operative Inc., for constructing a power plant; bids will probably be taken soon. Henry Pence, Eaton, representative.

GAMBIER, O.—Village, H. C. Parker, mayor, will probably take bids soon on construction of sewage system and sewage treatment plant costing $60,000 for which PWA has approved grant; voters approved bond issue for project. Consulting enginer, Paul A. Uhlmann, Columbus, O. (Noted Oct. 10.)

LANCASTER, O.—South Central Rural Electric Co-operative Inc., Darwin Kindler, manager, has been granted $332,000 REA allotment to enable construction of 318 miles power transmitting lines in eight counties. Project previously allotted $438,000 for 415 miles of lines.

MILLERSBURG, O. — Holmes Rural Electric Co-operative Inc., George Hefferline, superintendent, has been allotted $139,000 by REA for building 121 miles of transmission lines in four counties. REA previously granted $549,000 for 487 miles of lines.

MONTPELIER, O.—Northwestern Electric Co-operative Inc., Arthur Sherman, Hicksville, O., president, is taking bids due noon, Nov. 22, for constructing transmission lines costing about $110,000; certified check or bond 5 per cent of bid. H. A. Rushee, Montpelier, engineer. (Noted Oct. 17.)

SANDUSKY, O.—City, R. J. Wagar, manager, is taking bids due at noon, Nov. 22, for constructing waterworks to cost about $820,000. Project involves pumping and purification plants, reception and sedimentation basins and appurtenances. Certified check, draft or bond 5 per cent to accompany bid. Greeley & Hanson, Chicago, consulting engineers. (Noted July 18.)

SPRINGFIELD, O.—City, W. H. Story, manager, has received PWA grant of $491,211 and will probably take bids soon on waterworks pumping station, purification plant and reservoir costing total of $1,091,580. Consulting hydraulic engineers, Alvord, Burdick & Howson, Chicago.

TROY, O.—City, J. D. Boak, mayor, will soon advertise for bids on construction of sewage plant including settling tank, pumping equipment, sludge filtration and chemical mixing devices; cost to be about $143,000; PWA has approved grant on project. Consultant, George B. Gascoigne & Associates, Cleveland.

WOOSTER, O.—City, G. E. Allspaugh, service director, has completed plans and specifications and will advertise for bids on individual contracts of $81,819 water project; PWA grant approved. J. E. Fox, city engineer.

Connecticut

NEWINGTON, CONN.—PWA has allotted $346,500 grant to city which is drawing up preliminary plans for constructing a sewerage system, including sewage disposal plant, at cost of $770,000.

Massachusetts

NORWOOD, MASS.—Town is preparing plans and will take bids soon on extensions in its water system to cost about $63,320; PWA grant has been allotted. Engineers, Whitman & Howard, Boston.

New York

ALSEN, N. Y.—Lehigh Portland Cement Co., Allentown, Pa., has awarded contract to E. C. Machin Co., Allentown, for erection of an addition to its cement plant here at cost of about $250,000. (Noted Aug. 1.)

ITHACA, N. Y.—City council has plans in progress for improving city's water supply system at estimated cost of $500,000. T. E. Marble, city engineer.

LOCKPORT, N. Y.—Harrison Radiator Corp. has plans which will mature soon for alterations in its plant at estimated cost of $40,000. J. M. Tully, Lockport, engineer.

Michigan

BURNIPS, MICH. — Ottawa-Allegan Electric Co-operative Inc. is planning construction of a power plant on two-acre site to provide power for rural electric system. Will begin work soon; cost estimated at about $30,000.

DAVISON, MICH.—Village, Earl Hartman, clerk, is taking bids due Nov. 21 on construction of waterworks system costing $75,000. Bruce Buchanan Inc., Pontiac, Mich., consulting engineer. (Noted Oct. 31.)

KALAMAZOO, MICH. — Consumers Power Co. is building a generating plant which is scheduled to go into operation in May; will install two 35,000-kilowatt turbogenerator units.

PONTIAC, MICH.—City, W. P. Edmundson, manager, is taking bids due noon, Nov. 18, for sewage plant improvements (Contract No. 1) including low lift pump station and humus tank improvements. H. P. Jones Co., Toledo, O., consultant in project. (Noted Sept. 19.)

ZEELAND, MICH.—O. & A. Electric co-operative, B. Watkins, superintendent, awarded $775,890 contract for construction of 859 miles power transmitting lines to Donovan Construction Co., 1725 Carroll avenue, St. Paul.

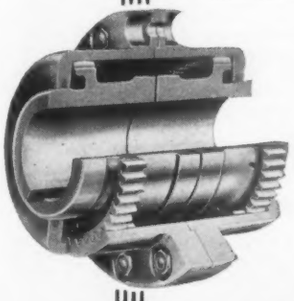
Illinois

CHICAGO—A.B.C. Tool Mfg. Corp. has been formed with $20,000 capital by H. Samcoki, R. M. Morton and E. Davis, to engage in general tool and die manufacturing. Charles Kramer, 33 North LaSalle street, correspondent.

ELGIN, ILL.—W. R. Meadows Inc., manufacturer of asphalt products, has awarded contract to Chas E. Giertz &

POOLE

FLEXIBLE COUPLINGS



ALL METAL • FORGED STEEL
NO WELDED PARTS

OIL TIGHT • FREE END FLOAT
DUST PROOF • FULLY LUBRICATED

Send for a copy of our
Flexible Coupling Handbook

POOLE FOUNDRY & MACHINE CO.
Baltimore, Md.

Son for construction of a one-story factory addition, 50 x 100 feet, and a 24 x 40-foot boiler house.

ST. ELMO, ILL. — Karchmer Pipe & Supply Co. has been incorporated with capital of $20,000 by A. Karchmer, L. M. Karchmer and E. Spiers, to deal in oil field equipment. Correspondent, Aaron Karchmer, St. Elmo.

WATERLOO, ILL. — Monroe County Electric co-operative takes bids due about Nov. 18 for constructing 175 miles of rural lines costing about $175,000. J. G. Cooney, Belleville, Ill., engineer.

Alabama

MOBILE, ALA.—Southern Kraft Corp., controlled by International Paper Co., will expend approximately $200,000 for improvements to its Mobile plant.

HOTEL
McALPIN

"A Great Hotel"

from $2.50 a day, single
$4 and $4.50 double

Broadway at 34 St., N. Y.

Under KNOTT Management
JOHN J. WOELFLE, Manager

Kentucky

BURKESVILLE, KY.—City will vote Nov. 8 on proposal to issue $65,000 in bonds to finance construction of municipal light, heat and power plant.

FULTON, KY.—Voters of Fulton and Hickman, Ky., vote Nov. 8 on bond issues totaling $190,000 for purchase of Kentucky Utilities Co. distribution systems or construction of municipal plants for TVA power. Seek federal grants totaling $155,000 in project.

Florida

DELANO, FLA.—City is planning waterworks improvement project costing $79,000 which has been approved by WPA. Grant Bly, city manager, in charge of plans.

FORT LAUDERDALE, FLA. — Port Everglades Refrigerating Co., George Kittridge, president, plans to construct one-story, 50 x 135-foot cold storage and refrigeration plant. Will cost over $80,000 with equipment.

Georgia

LA GRANGE, GA.—Troup County Electric Membership Corp., Frank Freeman, president, has REA allotment of $135,000 for construction of power transmitting lines.

Mississippi

LEXINGTON, MISS.—City, C. A. Glover, clerk, receives bids Nov. 17 for constructing improvements and additions to the municipal waterworks; project involves storage reservoir, pumping unit, etc. W. A. Fuller Co., St. Louis, engineer.

North Carolina

CHAPEL HILL, N. C.—Town will receive bids Nov. 8 for furnishing all materials, labor and equipment for construction of projected addition to sewage treatment plant.

DURHAM, N. C.—American Tobacco Co. is having plans prepared by Francisco & Jacobus, 511 Fifth avenue, New York, engineers, for construction of proposed five-story, 90 x 280-foot addition to its manufacturing plant. Building is to be concrete and steel, equipped with sprinkler system; cost approximately $500,000. (Noted Sept. 26.)

HIGH POINT, N. C.—City, E. M. Knox, manager, is having plans and specifications for hydroelectric projects revised by Murray & Flood Inc., engineers, New York; may award portion of work between Nov. 10 and 15. PWA has granted $2,595,000 and approved additional $2,921,600 grant and $3,571,000 loan. (Noted Oct. 24.)

SPARTA, N. C.—Town, R. F. Crouse, mayor, receives bids Nov. 11 for materials and equipment and construction of improvements to water works including lines, two pumping stations, deep wells and 100,000-gallon elevated tank; funds available total $38,000. William Freeman, High Point, N. C., consulting engineer.

South Carolina

ABBEVILLE, S. C.—City council voted to complete hydroelectric project for which it has been granted $435,000 WPA funds. Estimate project will develop 8,500,000-kilowatt hours primary power. (Noted Oct. 17.)

Tennessee

BAXTER, TENN.—Town, Will Sewell, mayor, receives bids Nov. 18 on two contracts for building and equipping waterworks system for which funds totaling $36,247 are available. (Project Tenn. 1283-F.) Consultant, J. A. Switzer, Knoxville, Tenn.

CHATTANOOGA, TENN. — Electric power board of Chattanooga, municipal building, opens bids Nov. 22 for construction of distribution substations for electric distribution system. (Sub-project contract No. 3K.) (Noted Oct. 10.)

WHITEVILLE, TENN.—City, J. E. Hollingsworth, mayor, votes Nov. 7 on proposal to issue $50,900 bonds to finance construction of municipal plant to distribute TVA power.

West Virginia

ELEANOR, W. VA.—Red House Mfg. Co. awarded $98,000 contract for construction of one-story, 317 x 96-foot mill building at Red House Farms project to George F. Hazelwood, Cumberland, Md. Alfred Marks, Pittsburgh, architect.

RONEYS POINT, W. VA.—Ohio county commissioners have received PWA grant and will probably take bids soon on sanitary sewage system costing $19,069. Consulting engineer, Frederick Faris, Wheeling, W. Va.

Virginia

BEDFORD, VA.—Rural Electrification administration has let contract to Perkins & Barnes, Blackstone, Va., for constructing 125 miles of lines. N. V. Stonestreet, Bedford, engineer.

VIENNA, VA.—Town votes Nov. 15 on bond issue to finance projected water and sewage system to cost $189,000.

Missouri

ST. LOUIS—Lincoln Engineering Co., 5901 Natural Bridge avenue, Frank S. Barks, president, will build one-story plant costing $52,000 to house machinery for production of lubrication equipment.

ST. LOUIS—Monsanto Chemical Co. has awarded contract for construction of warehouse for its phosphate plant to Fruin-Colmon Contracting Co., 502 Merchants Laclede building, St. Louis. Cost estimated at $100,000.

Arkansas

LITTLE ROCK, ARK.—E. L. Bruce Co. has begun work on a new mill building to replace the structure burned recently with a loss of about $100,000.

Wisconsin

BLACK RIVER FALLS, WIS.—Jackson county, H. K. Hanson, clerk, will take bids until Nov. 14 for construction of a one-story garage and maintenance shop costing about $35,000; will install traveling crane equipment. Auler, Jensen & Brown, Oshkosh, Wis., architects.

CUMBERLAND, WIS.—City, Mrs. K. D. Cavanaugh, clerk, takes bids soon for construction of a municipal light and power plant, including diesel engine generator and auxiliary equipment, and costing about $100,000. Engineer, G. L. Van Fleet, Dubuque, Iowa.

EDGERTON, WIS. — Highway Trailer Co., James W. Menhall, president, plans to start work shortly on factory addition estimated to cost $50,000 with equipment.

LA CROSSE, WIS.—Trane Co., R. N. Trane, president, maker of plumbing and heating specialties, is about to place contracts for erecting one-story, 80 x 260-foot fireproof plant addition estimated to cost $75,000 with equipment.

MILWAUKEE—Great Lakes Foundry

Corp. has been incorporated to deal in various metals by Hy Conkel, Frank Mareno and Joseph Liberatore.

MILWAUKEE—Fellenz Coal & Dock Co. has acquired 14 acres on South Menomonee canal as site for proposed coal-handling plant with facilities for self-unloading lake carriers.

Minnesota

MINNEAPOLIS—Toro Mfg. Co., maker of railroad and power equipment, has awarded contract to August Cederstrand Co. for constructing a one-story plant addition.

MINNEAPOLIS—Northern Pump Co., C. H. Juckes, secretary-treasurer, let contract for constructing one-story, 63 x 180-foot machine shop addition to Northwest Construction Co. Will install machine tools. (Noted Aug. 22.)

ST. PAUL—Northern Pacific Railway Co. is planning to construct immediately a one-story, 50 x 160-foot shop for car-unwheeling purposes.

Texas

BAYTOWN, TEX.—Humble Refining Co., Houston, Tex., has awarded contract for general construction of $1,000,000 phenol plant to M. W. Kellogg Co., 225 Broadway, New York. Work on plant is now underway.

BELLAIRE, TEX.—City, G. H. Miles, secretary, has filed application with PWA for assistance in the projected construction of a sewerage system and sewage disposal plant costing about $100,000; project includes collecting system, mains, treatment plant, etc. Plans being prepared by Garrett Engineering Co., Houston, Tex.

BROWNFIELD, TEX.—City has received PWA grant and opens bids Nov. 14 for waterworks improvements including well house, elevated tank, storage reservoir, and two high-speed pumps; expect available funds will total $52,000. (Project Texas 2316-F.) Consulting engineer, H. N. Roberts, Lubbock, Tex. (Noted Oct. 3.)

CORPUS CHRISTI, TEX.—S. C. Henderson and Western Supply Co., Tulsa, Okla., have contract to construct $370,000 absorption plant in Agua Dulce field. Capacity 65,000,000 cubic feet of gas daily to process 50,000 gallons of gasoline.

GONZALES, TEX.—PWA allotted $78,000 toward construction of $173,000 light and power system. Garrett Engineering Co., Houston, Tex., consultant. (Noted Aug. 8.)

HOUSTON, TEX.—Security Engineering Co. Inc. let contract to Austin Co., 105 North Greenwood, Houston, for constructing plant for treating alloy pipe against corrosion, cost being estimated at $35,000; includes air conditioning installation.

HOUSTON, TEX.—City has approved report of water board recommending construction of underground water supply system, and also approved application to PWA for a grant in proposed $11,800,000 water system improvement program.

MANOR, TEX.—City, W. O. Boineman, mayor, voted approval of bond issue and has received approval of PWA loan and grant totaling $21,000 for construction of electric system. Plans being prepared by J. W. Beretta Engineers Inc., San Antonio, Tex.

MARFA, TEX.—City, H. A. Coffield, mayor, receives bids Nov. 14 for extensions to waterworks costing $61,000. Frazer & Benner, El Paso, Tex., engineers. (Noted Oct. 3.)

PAMPA, TEX.—City, E. S. Carr, mayor, opens bids Nov. 16 for construction of waterworks including wells, pumps, elevated tank, feeder lines and meters; available funds, $225,000. Plans prepared by H. N. Roberts, Lubbock, Tex., engineer.

PECOS, TEX.—City, B. A. Toliver, mayor, opens bids Nov. 12 for construction of sanitary sewer extensions and sewage treatment plant; PWA allotted loan and grant totaling $100,000. (Project Texas 1647.) Consulting engineer, H. R. F. Helland, San Antonio, Tex.

PLEASANTON, TEX. — City, A. R. Troell, mayor, has voted bonds and now seeks PWA funds in the construction of proposed sewer system and disposal plant costing $27,272 and involving collecting system, lift stations, pumps, treatment plant and sludge beds. Consulting engineers, Garrett Engineering Co., Houston, Tex.

TEMPLE, TEX.—Brazos river conservation and reclamation district, John A. Norris, chief engineer, is taking separate bids until 2 p.m., Nov. 22 for installation at Possum Kingdom dam, two 17,000-horsepower hydraulic turbines, two 12,500-kilovolt amperes generators, two hydraulic governors and other equipment. Ambursen Engineering Corp., 295 Madison avenue, New York, engineers, are receiving sealed bids.

TRENTON, TEX.—City, J. C. McMillen, mayor, opens bids Nov. 14 for construction of waterworks project costing $23,200; PWA grant allotted (Project Texas 1685). Work includes 50,000-gallon elevated tank, motor and turbine pump. Joe J. Rady, Ft. Worth, Tex.; engineer.

WAELDER, TEX.—City has voted in favor of $28,000 expenditure for constructing municipal electric distribution system.

Colorado

FORT MORGAN, COLO.—City plans expansion in its electric plant which will cost $300,000.

Idaho

ST. MARIES, IDAHO—City has plans under way for water system improvements and main replacements for which $20,435 is available.

Arizona

FLORENCE, ARIZ.—San Carlos Irrigation and Drainage district, Coolidge, Ariz., has plans maturing for hydroelectric project at Butte power site, for which $5,119,000 bond issue and federal grant of $2,303,000 have been approved. Project includes storage and supply reservoir, power dam, generating station, substation and lines.

New Mexico

TUCUM CARI, N. M.—City has plans maturing for construction of new municipal electric power plant with lines and substations, costing about $416,000.

Pacific Coast

LODI, CALIF.—Smelters Corp., W. B. Thurman, president, has been incorporated and licensed to sell its capital stock by the state division of corporations.

McMINNVILLE, OREG.—School district No. 40 plans a central heating plant in two-story high school group; includes two oil-fired boiler units and auxiliary equipment, and costs over $130,000. Ertz-Burns Inc., Portland, Oreg., architect.

HOQUIAM, WASH.—B.C.H. Mining Co., 23 First National Bank building, has been incorporated with $40,000 capital by R. G. Hall and associates.

PALMER, ALASKA—City confronted by acute water shortage in Matanuska district and officials are rushing survey for construction of $25,000 water system.

Canada

VANCOUVER, B. C.—British Columbia Electric Railway Co. Ltd., A. C. W. Gage, purchasing agent, is making plans to construct hydroelectric development. Engineer, A. Vilstrop, care of owner.

BEARDMORE, ONT.—Nipson Mines, 1006 Bank of Hamilton building, Toronto, plans to construct steel and concrete gold-milling plant costing about $375,000.

SAULT STE. MARIE, ONT.—Chromium Mining & Smelting Corp. has awarded $60,000 general contract for construction of an addition to its plant to Central Bridge Co., West street, Toronto.

WHERE-TO-BUY

A classified list of advertisers according to products. ¶Index to advertisements gives page number of any advertiser.

ABRASIVES (Blast Cleaning)
Pittsburgh Crushed Steel Co., 61st St. and A. V. R. R., Pittsburgh, Pa.

ABRASIVES (Polishing)
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

ACETYLENE
Air Reduction Sales Co., 60 E. 42nd St., New York City.
Linde Air Products Co., The, 30 E. 42nd St., New York City.

ACID-PROOF LININGS
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.
Quigley Company, Inc., 56 W. 45th St., New York City.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.
Ampco Metal, Inc., 3831 W. Burnham St., Milwaukee, Wis.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

AIR CONDITIONING EQUIPMENT
Ross, J. O., Engineering Co., 350 Madison Ave., New York City.
Worthington Pump & Machinery Corp., Harrison, N. J.

ALKALI CLEANING COMPOUNDS
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

ALLOYS—See FERROALLOYS

ANGLE IRON BENDERS
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.
Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago, Ill.

ANGLES, CHANNELS—See BEAMS, CHANNELS, ANGLES

ANNEALING
Holden, A. F., Co., New Haven, Conn.

ANNEALING BOXES—See BOXES (Annealing)

ANODES (All Types)
Udylite Co., The, 1651 E. Grand Blvd., Detroit, Mich.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Co., Pittsburgh-Chicago.
Columbia Steel Corp., San Francisco, Calif.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Burnham, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BABBITT METAL
Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BALING PRESSES
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

BALL TRANSFERS
Mathews Conveyer Co., 142 Tenth St., Ellwood City, Pa.

BALLS (Bronze)
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

BALLS (Special Alloy Metals)
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

BAND FILES (Metal)
Continental Machine Specialties, Inc., Dept. A, 1301 Washington Ave. So., Minneapolis, Minn.

BAND SAWS (Metal Cutting)
Continental Machine Specialties, Inc., Dept. A, 1301 Washington Ave. So., Minneapolis, Minn.

BANDS—See HOOPS AND BANDS

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Wallace Supplies Mfg. Co., 1310 Diversey Parkway, Chicago, Ill.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Maryland Dry Dock Co., Baltimore, Md.

BARRELS (Plating)
Udylite Co., The, 1651 E. Grand Blvd., Detroit, Mich.

BARRELS (Steel)
Petroleum Iron Works Co., The, Sharon, Pa.
Pressed Steel Tank Co., Milwaukee, Wis.

BARS (Alloy)
Ampco Metal, Inc., 3831 W. Burnham St., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel Co., McKeesport, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Midvale Co., The Nicetown, Philadelphia, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.

BARS (Concrete Reinforcing)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Reinforcing)
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.

BARS (Steel)
(*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
*Midvale Co., The Nicetown, Philadelphia, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BASKETS (Dipping)
Cambridge Wire Cloth Co., The, 101 Washington St., Cambridge, Md.

BATHS (Heat Treating, High Speed)
Holden, A. F., Co., New Haven, Conn.

BATTERIES (Storage)
Edison, Thomas A., Inc., Orange, N. J.
Electric Storage Battery Co., The, 19th St. and Allegheny Ave., Philadelphia, Pa.

BEAMS, CHANNELS, ANGLES, ETC.
(*Also Stainless)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
*Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Levinson Steel Co., The, 39 Pride St., Pittsburgh, Pa.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Torrington Co., The, Torrington, Conn.

BEARINGS (Bronze)
Ampco Metal, Inc., 3831 W. Burnham St., Milwaukee, Wis.
Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O.

BEARINGS (Journal)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Needle)
Torrington Co., The, Torrington, Conn.

BEARINGS (Oilless)
Rhoades, R. W., Metaline Co., 50 3rd St., Long Island City, N. Y.

BEARINGS (Quill)
Bantam Bearings Corp., South Bend, Ind.

BEARINGS (Radial)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St., and Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roll Neck)
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.

Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

New Frontiers Are Within

To the Editor:

Business men are doing a lot of mourning about their businesses. There may be cause for that as they read financial statements depicting melting surpluses, but it is something like repairing the sail of a boat that has a large hole in its hull. Get the nation to thinking right and all else is incidental. While business men tear their hair over this and that detail, new frontiers close in and the termites from the world's water fronts bore in. There is the answer. All should get to work on it.

Between 1790 and 1930 the net wealth of the nation grew from 500 million dollars to 375 billion dollars. In the same period the national income advanced from 440 million to 80 billions. This growth destroyed the exterior American frontiers. The indefinable American spirit ate up the far-flung spaces. Our population kept pace. As a result our frontiers are now within.

But the great march has left many hanging to the ropes. They want to get somewhere but someone has told them that there is no place to go unless the *socialization* program takes care of them and there we meet the first frontier with its wages and hours, tabulations, social security, equal distribution of the national wealth, land conservation, crop regulation and the remembering of the forgotten man. Business must carry this program, your business and every other business. That will be all right if the power with which to carry it isn't reduced. You cannot pile it on the cars and take it out of the engine at the same time.

So far, or between 1930 and 1937, the cost of the federal government has increased 1068 per cent. The per capita cost of that government has risen 735 per cent. The public debt in that period has increased 3075 per cent and the per capita share of that debt has gone up 2120 per cent. (The figures are by the Detroit Chamber of Commerce). This is a weakening process. Coupled with the teaching of equal sharing for all, regardless of ability or application, you have the most dangerous frontier this country ever has faced. *communism.*

In the wake of these disclosures come the spies and their propaganda and the superintendent of police of my city predicted open conflict unless the federal government came in to prevent it. Yet anyone who dares to point to this as an issue is a "Baiter." He is out of date and just doesn't know about present day needs, and there's the other frontier, *realism.*

T. RUSS HILL

President,
Rexair Inc.,
Detroit, Mich.

Big Job but Can Be Done

To the Editor:

If the United States Chamber of Commerce and the National Association of Manufacturers should join forces, enlist the support of all important national business organizations, provide adequate financing, retain the best public relations counsel available to organize and direct a comprehensive national and local campaign for public enlightenment, I believe that the public could very quickly be enlightened as to the benefits which the entire public receive from American business operations, as to the fundamental economic factors involved, and that an entirely new attitude toward business could be brought about within a year.

American business has never presented a united front in public relationships, has never attempted to do a comprehensive job of this sort, and while sporadic efforts have been made by such organizations as the United States Chamber of Commerce and the National Association of Manufacturers with some good effect, the job has never been taken with real seriousness by business men generally, nor have adequate finances been provided.

Any adequate program must be developed with full knowledge of competitive forces. The amount of printed matter, radio time, the ability and numerical strength of personnel engaged in propaganda inimical to business development will be found to be of startling proportions, and no competitive program can be effective unless it is based upon a comprehension of this fact and provided with comparable facilities.

Probably the most effective work will be done locally by groups sensitive to rapidly changing local conditions and intimately acquainted with local opinion-making groups, operating under a program flexible enough to cope with such conditions.

A comprehensive training program would be necessary in order to develop suitable personnel. This should be recruited from men of sound fundamental training, preferably from such institutions as the Harvard School of Business Administration, Wharton School, etc., who have majored in public relations or have shown an understanding interest in this subject. All available media should be utilized to the full extent, both nationally and locally—national publications, local newspapers, national and local radio hook-ups, direct mail, group meetings, public forums, etc.

Business men have so far been too content to express their views to like-minded people. Arthur Morgan and Alfred P. Sloan write for the *Atlantic Monthly.* Others address business conventions and their influence does not reach beyond the room in which they are speaking . . .

The job can be done and may be done if or when business men generally realize, first, that it must be done and, second, achieve some conception of its magnitude.

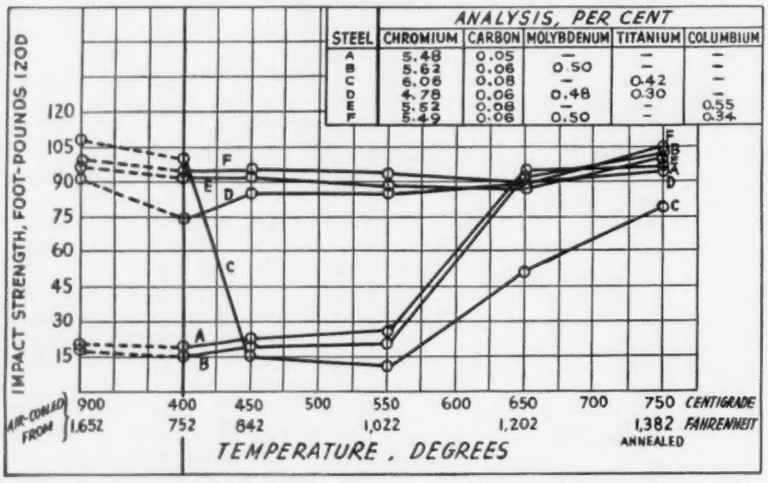
LOUIS RUTHENBURG

President,
Servel Inc.,
Evansville, Ind.

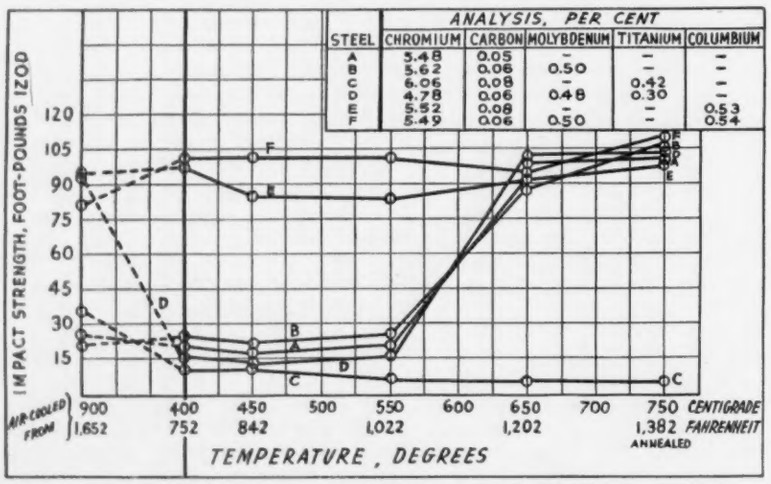
Columbium Stabilizes Toughness of the 4 to 6 Per Cent Chromium Steels

About 0.50 per cent of columbium in the wrought 4 to 6 per cent chromium steels makes these steels retain their toughness at room and sub-zero temperatures, after being subjected to the wide variety of temperatures encountered during fabrication and service. Even at 40 deg. F. below zero, the columbium-bearing steels do not become brittle regardless of the previous heat-treatment. This ability of columbium to stabilize the toughness of 4 to 6 per cent chromium steels makes possible their use even at very low temperatures without danger of breaking because of embrittlement.

For further information, write for "Advantages of Columbium in Wrought 4 to 6 Per Cent Chromium Steel, S3-6124". This booklet and further data on any other Electromet ferro-alloys and metals, will be gladly furnished on request, without obligation. Electro Metallurgical Company, Unit of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York.



The 4 to 6 per cent chromium steels represented in this graph were air-cooled from 900 deg. C. (1,652 deg. F.), then heated to and held for 700 hours at the indicated temperatures, furnace-cooled, and tested for toughness at room temperatures. Only the two columbium-bearing steels (E and F) showed good impact strength after all heat-treatments.



The 4 to 6 per cent chromium steels represented in this graph were treated as above, and tested for toughness at -40 deg. C. (-40 deg. F.) instead of at room temperature. Again only the two columbium-bearing steels (E and F) showed good impact strength after all heat-treatments.

Electromet
Trade-mark
Ferro-Alloys & Metals

CHROMIUM
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
High-Carbon Ferrochrome (maximum 6.00% carbon)
High-Nitrogen Ferrochrome
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

CALCIUM
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon

ZIRCONIUM
12 to 15% Zirconium
35 to 40% Zirconium
Aluminum-Zirconium

SILICO-MANGANESE
All grades including Silico-Spiegel

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

SILICON
Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
"Silvaz" Alloy
Silicon Metal
Miscellaneous Silicon Alloys

VANADIUM
All grades

BRIQUETS
(Patented)
Silicon Briquets
Manganese Briquets
Chromium Briquets

COLUMBIUM

TUNGSTEN

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

The words "Electromet" and "Silvaz" are registered trade-marks.